

RECORD

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82/21

Books # 95

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End No. 53926



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A Bostrom & Pease Product

1971 England

1

Mar. 12 Monk's Wood
Experimental Station

Old field just east (?) of
station - about 5-6 acres,
surrounded by hedges.

Gray clay soil
~~Open to stone~~
stand of tall
herbs and shrubs in a
continuous grass ground
layer. One of the grass species,
a fine mat-former with a
coarser erect species or two
from the ground cover.

A low arching *Rubus*
is generally common except
in the sparsest areas.

A tall *Rosa*, to 2.5 m very
common. *Dipsacus sylvestris*
locally abundant, to 1 m tall.
A very few *Quercus* of petraea
about 1 m, with orange-brown dry leaves.

Epilobium sp. (or spp.) 1-1.5 m
abundant, also *Cirsium* cf.
arvense. In some parts the
grass ground cover is replaced
by a hybridized moss with
green rosettes of *Daucus* (?) sp.,
Cirsium sp.?, *Dryopteris* sp.,
plus a few other green rosettes.

Very occasional saplings of
Fraxinus sp., *Quercus robur* (?),
(leafless), a thorny *Pyrus* (?), and
perhaps other trees or shrubs. A

1971 England

dry grass to 0.8 m forms occasional tufts, and a conspicuous gregarious grass with white dry wide leaves and ~~for~~ rather close panicles forms patches, esp. in low spots.

The Rubus has non ridged canes, purple, very spiny, ~~partially~~ becoming procumbent or prostrate a few leaves persisting white beneath, purple or rarely green above.

Mammal (deer??) droppings and bird (pheasant? or chicken) droppings common.

Mar. 14 - auto trip Cambridge to Stretham and Wicken Fen

Flat land - low chalk "ridge" with reddish brown silty soil. Hedges, a few orchards, many pastures & plowed fields. In distance to north north west slightly higher ground which is Jurassic ~~of~~ green sand (glauconitic) "islands" in the low, formerly wet ground. The low ground was formerly covered by

"mires", shallow open-water ponds, now drained.

Stretham.

Stretham Mere - gray fine soil.

River Cam.

Slight elevation - a Jurassic coal reef.

Wicken

Wicken Fen - owned by National Trust.

Large area of peatland covered by a mosaic of tall scrub or scrub forest of dense Rhamnus, Salix, Acer, etc. and patches of marsh or, rather, bog, of Phragmites and locally Cladium, 1-2 m tall. This grass is periodically harvested for thatch.

Scattered in the scrub are occasional Betula alba showing a tremendous range of habit - upright almost fastigiate branching to pendulous. Very occasional Fraxinus.

Water table essentially at surface of peat.

Maintained thus artificially against the too effective drainage of the agricultural land round about, which has

sunken even to below sea level by decomposition of the peat.

A Dutch style windmill, originally from Adventurers Fen, reconstructed here by the Trust. Said to be the last remaining of the thousands of "windpumps" originally used to drain the fens.

A thatched tower "hide" provided for bird-watching.

The Wicken Fen Group maintains and protects the fen, provides guide-booklets, etc.

The scrub is cut periodically to avoid succession to oak forest.

Wicken north through Soham over somewhat higher Jurassic land. Through Qua Fen and the Hasse - black peaty soil on low ground. Rows of large *Ulmus*, *Populus*, etc. All land cultivated.

Prickwillow

"Rottens" are old riverbeds of mineral sediments winding across the peat lands left now as slight ridges

by the subsidence of the drained peat lands. Light colored against the black peat soil. Less fertile than peat.

Ely is on a very large Jurassic "island". Peat land largely used for sugar beet and market gardening.

Ouse River channelized between levees and water level substantially higher than the peatland surface.

No hedges in peat lands. Land too valuable.

Houses ~~of~~ frequently built on "rotters", more substantial than peat for foundations. Some of the rotters have archaeological remains of a number of levels on them.

Flocks of gulls are rather frequent on plowed peatland.

Deep ditches frequent, water table well below surface.

Approaching Mildenhall we left fenland and got onto slightly higher chalk land. Church built of flints.

R.F. airbase - Mildenhall.

Flint construction here is of angular fragments rather than of nodules, ~~and~~ much more crowded.

Mildenhall - very irregular knolly surface, stabilized dunes of glacial sand.

East of Mildenhall extensive planted pine forest and ^{some} mixed hardwood, largely birch. Road lined by pine. Gorse along road and in hedges and forest edges. Patches of pines.

Rolling heathland and vast *Pteridium* stands. All of this - pine, heath, bracken, on glacial sands on top of chalk. Planted pine stands perhaps 20-25 cm dbh 10-15 m tall, very small oaks, 1-2 m, with persistent orange dead leaves common under pines. Patches and edges of birch.

Wangford Warren (Suffolk Naturalists Trust).

Rolling area of partially stabilized, partly active dunes, tending to be grass or *Carex* covered, patches of birch, mostly weeping a few scattered very small pines and oaks, *Sambucus*.

Large areas principally stabilized by mosses & *Cladonia*.

Much denser *Carex* sod. plants 20-25 cm tall.

Total relief perhaps 8-10 m.

Random - much flint construction. Pine forest & birch forest, planted. Grimes Graves road. Sand heaths.

Dense pine plantation. trees to 30 cm dbh 20 m tall. Large open area - Grimes Graves. Chalk slope covered by 50 cm[±] of aeolian sand, the grooves in the chalk surface, normal to slope strike, are reflected in stripes of *Calluna*.

"Graves" themselves an area of dimpled terrain, appearing like sink-holes, but excavation shows they are vase-shaped holes with horizontal shafts radiating, following flint nodule layers in chalk - pits ± 20 m deep. Ancient flint quarries. Spread over top of low rise.

Calluna stripes are of order of 3 m wide, grass stripes 4 m. Chalk is 1 m or more below the *Calluna*, 15 cm[±] below the grass.

Thetford - large area of pine forest on sand on chalk.
~~Thetford~~

West, Suffolk limit
some bits of heather.
mostly open pasture
with rows of trees. Gorse.
Heather, but open.

Then RAF Honington ^{1 1/2 mi} W of Barnham
a large fenced area
basically a dense short
grass matrix with
areas of fairly dense
heath 0.5-1 m tall with
small openings with deep
moss, slopes with
somewhat irregular
heath stripes, upper
part of very wide
knoll with scattered
Ulex clumps, 1-2 m tall
large spreading oaks
50-200 m apart. Scattered
over the whole clumps
of Cytisus 2-2.5 m tall.

Grass said to be recent
clearing, but it seems
the gorse must be at
least several years old.

Flints abundant.
Much moss in grass.
Grass to west on
gentle slope with
no shrubs at all.

Calluna stripes on
very gentle slopes.
A few sheep.

West of this near Newmarket
road, Elvenden, rather
old mixed woods, patches
with large and small fields
and patches of pine plantings.
A trimmed pine hedge along
Newmarket - Lodey road south
of Elvenden, for several
miles on one or both sides
of road. Guinness property.
Large heath area.

Fields separated by tree
hedges, mostly pine.

About 12 mi. ^{NE} of Newmarket.

3 mi ~~SE~~ NE Wickenhall.

Same general landscape
mosaic, at first more
fields, then predominantly
forest plantings.

5 road intersection near
Barton Mills.

Now mostly fields with
hedges, small patches of wood.
Light gray-brown soil on fine
chalk with only small flints.
Chalk quarries.

Rows and patches of conifers,
some birch. Hedera conspicuous
climbing roadside trees.

Then, large fields, few
hedges, some patches of wood.
gently rolling land. Few
hedges because of race-horse
breeding and riding, large pastures.

north^{east} of Newmarket.
 strips of deciduous trees.
 Newmarket large houses
 in large lots.

west to Cambridge
 strips of trees between
 fields and along roads.
 some hedges.

large fields.

soil reddish brown, then
 light gray, all on chalk.
 Hedges trimmed very low.

Mar 14 - Wangford Warren.
 Norfolk

~~are~~ semi-stabilized
 sand dunes

- 53636 Cladonia
 37 Cladonia
 38 Cladonia
 39 Cladonia
 40 Cladonia
 41 (moss)

for all of above - contributing
 to stabilizing of

~~Mar. 14 1 1/2 mi n.w. of Barnham~~
 Mar. 14 near Gimmes Graves,
 Norfolk

in "calluna stripes" on
 gently sloping chalk covered
 with sand

42 (moss)

common

Santa Catalina I

H I

Porella navicularis (Lehm. & Lindenb.) Lindb.

England

53641

Polytrichum piliferum Hedw.

53642

Pleurozium schreberi (Brid.) Mitt.

53644 a

"

"

53645 a

"

"

+ *Hypnum cupressiforme* Hedw.

north of Newmarket.
 strips of deciduous trees.
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 in large lots.

west to Cambridge
 strips of trees between
 fields and along roads.
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in "calluna stripes" on
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- 42 (moss)
 common

12

1971 England

53643

Calluna vulgaris
dominant

B

Mar. 141 - 1 1/2 mi. n.w. of Barmham,

Suffolk

in small open spots in
Calluna heath

44

(more)

45

(more)

Suffolk
~~Rafles~~

13

dwarf shrub 30-40 cm tall.

forming deep loose cushions
forming deep loose cushions

Mar. 21 Roland Bull Run Mt.

Quartzite cliffs

Evergreens abundant
on cliffs, scarcely any
away from them.

Pinus pungens

Pinus virginiana

Kalmia latifolia

Plants with photosynthetic stems

Aspidoxylon rotundifolius

Vaccinium vacillans

March 28 - Roland
 2 seepy areas where
 springs issue from
 base of mts. and
 very small streams
 come down off lower slopes,
 one on each side of Roland
 Center. In one a large
Vaccinium 2.5 m, near
 the other a smaller bush.
 In bud but no flowers opening.
 In each a small clump
 of *Lycopodium lucidulum*
 and in each a small
 stand of *Chrysosplenium*;
 this in areas just below
 springs, absent from
 wet places fed by streamlets

Mar. 28 - north branch
 of Broad Run, 2 miles
 west of Thoroughfare Gap
 bottom land woods
 on clay flats

53643 *Ulmus americana*
 occasional

8 44 *Ulmus*

Mar 28 - Roland Center, west
 base Bull Run Mts, 2 mi n.w. of
 Thoroughfare Gap

45 *Chrysosplenium americanum*
 very local in wet place fed
 by springs.

north branch Broad Run
 bottom land forest
 locally swampy.
American elm occasional,
elm with corky bark
 rare. Both in flower.
 Red maple in full flower.
 2 wood-ducks in stream.

tree 12 m tall, bark flaky,
 without corky ridges; anthers deep purple
 spreading tree 6 m tall, bark
 with corky ridges; anthers maroon.

prostrate, flowers green.

Mar. 31 - left Dulles airport
for San Francisco 9:15 a.m.
crossed Blue Ridge at 9:23.

Bull Run Mts. Blue Ridge,
Massanutten, Alleghenies -
Hardwood forest brown,
Evergreens ~~on~~ mostly ~~the~~
west, northwest and southwest
slopes. This pattern becomes
less pronounced in Alleghenies,
where, indeed, evergreens
become somewhat less common,
especially in the western
ridges. Locally still common
but general aspect is brown.

West of ~~the~~ the last
main continuous ridge
is an area of rather irregular
mountainous country with
broken ridges - some snow
here. A few large coniferous
patches here, especially in the
snowy uplands. No particular
pattern. Still slight emphasis
on conifers on west slopes in
draws.

One last rather continuous
range, with a river cutting
through it westward, then
turning north. Somewhat
hilly piedmont country. Another
small crooked river running
n.e.

This complicated hilly country

Super
DL-8
right side.

9:51

extends far to the west, to
the Ohio River, running
south and curving west,
looping north, back
south - crossed it over a
large town where there is a
major affluent from the east.
Country west of river less
hilly but still not level -
about half wooded - less
so a bit to north.

9:58

A mega-meander pattern
outlined by a broad belt of
almost completely cleared
land with only a small
meandering stream in it -
joining a similar but
much more marked
north-south belt of completely
cleared intensively farmed
light colored land with a
somewhat meandering large
river, this belt very flat in
otherwise hilly mostly wooded
country. West of it wooded
hills with ~~dead~~ ^{valley} bottoms
forming a striking dendritic
pattern, main stream
running northeast.

10:01

West of this the hills rapidly
dwindle and the proportion of
cleared land correspondingly
increases.

10:03

almost completely cleared from here on.

10:05

crossed Ohio River again now flowing slightly northwest then west, then swinging northwest. Country rather hilly on both sides, esp. the Kentucky side, somewhat wooded.

10:08

A higher wooded clump of mts., Ohio River goes more northerly, for some distance, then more westerly. Northern Kentucky is very complicated - hilly. River comes south again.

10:12

then westward. Similar hilly country on both sides, about 50% wooded, less so westward. Follow river slightly meandering westward.

Not much bottomland along most of it, except on inner sides of curves.

10:16

crossed river (Ohio R.).

Land much more checkerboard pattern, 75% cleared.

Level country, rivers trending south south west. Considerable woods along river and in several patches of hills, also trending same direction.

10:21

Fair-sized braided river, very closely meandering, through a clear valley.

Then an area of patches of wooded hills just to north with a large reservoir in west

part (Knobs Country?)

10:25

10:26

608.4 - 80% wooded low hilly country. Large reservoir and south of it an extremely complex maze of roads - elongate buildings along many of them - military establishment?

10:22

Small river with extremely complex meander pattern with many oxbows scattered over a broad level plain, all cleared. From here on mostly cleared except for a few tiny woodlots.

10:31

Prob. Wabash R. Mostly agricultural land west of it, but appearing somewhat scabby and eroded. Drainage trending s.s.e. to a generally e.-w. stream with many oxbows swinging n.w. and w.-n.w.

Meander and oxbow patterns very visible at this season.

10:36

Rather regular agricultural checkerboard except for s.w. trending valleys that are partly wooded. Visibility gradually deteriorating in a grayish haze or thin cloud layer.

10:39

Major s.w. ne highway.

Agricultural pattern continues with some wooded land irregularly left along valley bottoms.

10:43 Lack wooded valleys become numerous, running s.w. toward Mississippi north of St. Louis.

10:50 Crossed Mississippi flowing almost eastward below confluence of Missouri, which forms a complex delta of wooded bars and elongate ponds and channels.

10:52 Both rivers run parallel n.e. Missouri has some wooded bottom land.

Westward quite a bit of wooded country mixed with agricultural land. Dendritic patterns.

10:58 Visibility gone.

11:30 Base of Rockies -
Pikes Peak

Mts here very largely not wooded, a patchily so with open to dense conifer stands. Little snow. Large bare interior valleys before massive high snow-covered ranges reached.

The valleys ^{between} the higher ranges much more wooded and lack the bare rocky areas farther east.

12:45 Farther west there are again large bare valleys.

1:05 A large river winding through a new desert, in a gorge.

1:05-1:12

This area is about the most extensive desert roadless area I have seen. Much cut by gorges - probably the reason Captain said it ~~was~~ (or includes) Arches Nat. Monument.

Westward spectacular erosion in red rocks.

1:20

Rough country with large accumulations of snow in valleys and depressions, these often speckled, as though just the tops of trees were showing. Higher ridges and peaks with little snow. Large dry lake, almost white, in middle distance to north.

2
1:37

Then vast desert area with a few roads but little disturbance, scattered ranges of low mountains with open forest or scrub. Much higher snow-covered ranges ahead.

Many other dry lakes westward

1:53

a cluster of black-rimmed pools in a dry lake.

2:31

In ~~hills~~ foothills north of Altamont Pass a localized display of a deep yellow flower - from air like spilled chrome yellow paint.

South of Altamont Pass
on San Joaquin side, the
north slopes of lateral ridges
have stream trees or large
shrubs and are grassy
moderate slopes; south
slopes are treeless, rocky
and eroded-looking.

Apr. 2, Lawa Valley -
Pacific Tropical Botanic
Garden

A series of ravines
cut in sloping sugar
cane land, ~~red~~ volcanic
soil on flow basalt,
wooded with secondary
thickets of

Psidium guajava

Eugenia cuminii

Hibiscus tiliaceus

Schinus terebinthifolius

Leucaena leucocephala

Casuarina equisetifolia

Pithecellobium dulce

Terminalia catappa

Thevetia peruviana

Lamanea samana

Cassia surattensis

Melia azederach

vines.

Passiflora edulis

Passiflora sp.

Ipomoea indica

Anavalia cathartica

Cardiospermum halicacabum

Pityrogramma triangularis

Portulaca oleracea

Comm.

Ipomoea carnea

L.

Ag. Fouquieria foetida

Euphorbia carthagenensis

Albizzia falcataria
Shatthodes cantharidifolia
Mussaenda citrifolia
Psidium cattleianum
Ficus microcarpa
Recurvum communis

Xanthium
Blanchetia odorata
Erechtites hieracifolia
Conyza bonariensis

herbs & suffrutescent herbs:

~~Nephrolepis~~

Nephrolepis cf. multiflora

Phyllanthus urinaria

Stachytarpheta urticifolia

Stachytarpheta dichotoma?

Emilia javanica

Polypodium scolopendria

Lida acuta

Plantago major

Centella asiatica

Commelina diffusa

Croton taylorii

Amaranthus spinosus

Triumfetta semitriloba

Paspalum conjugatum

Paspalum fimbriatum

Malachra

Cassia occidentalis

Cyperus rotundus

Abutilon

Mimosa pudica

Cynodon dactylon

Eleusine indica

Gomphocarpus physocarpus

Bernonia cinerea

Digitaria cf. pruriens ciliaris

Elephantopus mollis

Oxalis

Rivina humilis

Sonchus oleraceus

Chloris barbata

Kalanchoe

Bidens pilosa

April 2 [Hawaii Valley (Pacific
Tropical Botanic Garden)]

open sloping volcanic soil

53646 *Nephrolepis multiflora* (Rostk.) Presl
common on road cut

47 *Phyllanthus* ~~*debilis*~~
common in roadside ditch

April 2 - [Piper Beach
grounds of Sheraton Kona Hotel]

48 *Ruppia maritima* var. *pacificicola* J. Ag. et
abundant, rooted, in
small probably artificial
pond, not conspicuously brackish
at least in rainy period

49 *Wedelia trilobata*
planted as bedding plant

April 3 - Hawaii Valley above
Pacific Tropical Botanic Garden

50 *Rubus moluccanus*
very local in pasture

April 3 - [Hawaii Valley
(Pacific Tropical Botanic Garden)]
in irregular mosaic of
secondary vegetation

51 *Digitaria*
very local in ravine near water

150m

erect, pubescence white

erect

prostrate, creeping,
rooting at nodes, flowers
bright yellow

200m

rhizomatous, canes arching;
sterile, low here, but
in another patch said to be
up to 4-5 m tall, tangled.

above Purple

100m

decumbent, spreading, rooting
at nodes.

(to page 32)

April 2 - Lāwai Kai -
Allerton Garden

Very manicured jungle
with great range of
introduced trees, shrubs,
vines, herbs

April 2 - Poipu Beach,
(Sheraton Kauai hotel)
flora of basalt rock
strand with storm
beach much vegetated

Pluchea indica
Ipomoea pes-caprae ssp. *hawaiiensis*
Lesoum portulacastrum
Sporobolus virginicus
Thespesia populnea
Scaevola taccada
Ipomoea indica
Leucaena leucocephala
Loranthus oleraceus
Casuarina equisetifolia
Jacquemontia sandwicensis
Eragrostis tenella
Euphorbia glomerata
Solanum nigrum
Euphorbia hirta
Tournefortia argentea
Sida fallax

These on a 40-m stretch
of rock strand, without
penetrating back into
low scrub vegetation
on storm beach farther
than could be seen from
edge.

(from 10.22-23)

~~53651 Malachra~~

[same - Big Valley

53652 Malachra

(6) local patch in moist valley bottom

(4) 53 Thevetia peruviana (L.) Pers
abundantly naturalized
in valley bottom and lower
slopes[same - below administration
area(6) 54 Stachytarpheta dichotoma
common in weedy roadside(6) 55 Phyllanthus ^{debilis} ~~reissneri~~

very common

(4) 56 Passiflora
climbing in tall thicketApr. 4 - 11.8 mi. s.w. of Polihale State Park
west side of Island

on sand dunes just back of beach

(6) 57 ~~Ipomoea~~ Ipomoea stolonifera
very locally abundant in swales
between dunes(8) 58 Cassytha filiformis
locally abundant blanketing
small trees

120 m

sparsely branched suffrut-
escent herb 3 m tall, flowers
bright yellow.lactiferous shrub 3 m
tall, flowers bright yellow.

175 m

herb up to 1.6 m tall,
flowers medium blue.
(with S. urticifolia but
no intermediates seen)
erectextensive vine, bracts
whitish green, petals
and sepals with dark red
spots, outer corolla pinkish
red inner corolla blue
violetprostrate stems buried
leaf blades flat on sand, collars
white, closed at 4 pmstems green to orange, green
where partly shaded;
flowers white. (to 1.36)

April 4. Polihale State Park

Sand dunes covered by
half-dead *Prosopis*. Open
areas with *Verbena*
enceloides. *Portulaca*
cyanocephala. extensive
mats of *Vitis ovata*.
Ceanothus echinatus. *Setaria*
verticillata. *Solanum nigrum*
Solanum lycopersicum.
Sporobolus virginicus.
Scaevola taccada.

(2) *Digitaria* sp. *Baccharis*,
Leucaena microcephala.
Chenopodium murale.
Waltheria indica. *Conium*
javanica. *Ardisia coccinea*.
Dodonaea viscosa. *Sonchus*
oleraceus.

1.3 mi. W of Polihale

Ipomoea stolonifera

~~*Ipomoea*~~

Cassytha filiformis

April 4 - (Polihale State Park
west side of island)
on sand dunes just back
of beach

53659 *Portulaca cyanosperma* Egler
(8) very common in openings

(8) 60 *Sida fallax* Walp.
common in openings and
dwarf scrub

(10) 61 *Boerhaavia cf. repens* L.
common in openings

(4) 62 *Solanum elaeagnifolium* L.
common very locally in opening

(4) 63 *Vitex ovata*
very common on seaward
part of dunes

April 5 - Lihue

planted or spontaneous
in roadside clumps of forest,

(2) 64 *Macaranga* ♀
(2) 65 *Macaranga* ♂
(8) 66 *Macaranga* (young)

prostrate, fleshy, roots
thickened, corollae deep
magenta purple, closed
at 5:30 - 6:00 p.m.

depressed shrub, corollae
~~se~~ broadly campanulate,
somewhat reddish in center.
creeping stems radiating
from thickened root,
elongate; leaves whitish
beneath, flowers white
(all plants seen had white flowers)
aromatic; flowers yellow,
fruit green.

woody stems prostrate,
forming very large mats,
flowering branches erect,
corollae bluish purple.

trees to 10 m tall.

" " " " " "

April 7 - Honolulu, Palama,
near Palama Elementary School

- 52666 *Lynedrella ginsbachii*
abundant along fences
and in lawns

April 9 - Haleakala Road,
west slope of Haleakala

- 67 *Vaccinium reticulatum* L.
very common in open scrub
- 68 *Vaccinium reticulatum* L.
very common in rather
dense scrub.

prostrate to ascending,
flowers yellow.

Mau

- 6300' leaves slightly dull glaucous,
shrubs 0.4 - 0.8 m tall, flowers
pendent, red with pale
green lobes. 64 plants represented
- 8000' shrub 0.8 m tall, leaves
slightly dull glaucous,
2940 m flowers pendent, reddish to
greenish red (on some bush), lobes
pale green, ripe fruit dark
red. (all specimens from same bush)

April 10 - Haleakala Road 6500'±
Leprechinia locality -
 the road widening did not
 eliminate the *Leprechinia*
 plants - 2 are still present
 on the top of the road cut
 Another substantial
 clump is on an east slope
 30-50 m. in. from the road
 Full flower.

Open scrub, *Styphelia*
 dominant, *Vaccinium*
 common, a few *Lophos*
 bushes, *Pteridium*, *Coprosma*
ernodioides, *Polypodium*
pellucens, *Asplenium*
adiantum-nigrum, *Pellaea*
ternifolia (12), *Anthoxanthum*,
Holcus, etc. *Hypochaeris radicata*

Small gulch - walls have
Lophos in some abundance,
 a few *Coprosma montana*,
 a few *Dodonaea*, 1 shrubby *Dubautia*
Considerable Eupatorium adenophor
um badly galled but still
 flowering. a few small
Santalum

Crater Rim, Haleakala
 Many or most of the
Dubautia shrubs in the
 main visitor center area
 are dead or almost so.

April 11 - visited Colin Fenner's
 place, Kula. 4000

Several very healthy
Leprechinia plants in his
 garden, very vigorously
 flowering. not a bad
 ornamental - reddish mauve
 flowers. seeds from 6500' on
 slope above - see p. 40.

Many handsome *Proteaceae*
 flowering - *Protea*, *Leucospermum*,
Leucadendron, etc. Also some
 interesting *Myrtaceae* from
 Australia.

April 12 - flight Kaula-Hilo 9:55 am

Forest on slopes of Haleakala bet. Hailu and Hana seem generally in poor condition - patches of *Gleichenia* are abundant.

Gulches below Hailu in cane areas have strings of *Asterites*. Would be worth looking into.

Much snow on Mauna Kea, down to probably 10,000'. some also on Mauna Loa but not down as far.

Along Hamakua coast w. of Hilo much floating bagasse out a mile or so. Much silt at mouth of one large canyon about half way bet. Laupahoehoe and Hilo. Many bare fields above. Waterfalls conspicuous along this section, pouring into ocean. Quite a bit of bagasse close in toward Hilo.

Volcano Road

Just below 3000', *Tritoma* very orange - apparent effect of SO₂.

Kilauea Iki Overlook

Lycopodium complanatum in not unhealthy condition, though slightly yellowish.

Just before Puhimau on Chain of Craters road, in depression with many old dead *Lehua* trees, almost all small *Lehua* killed by frost in ~~Dec~~ 1969.

Hilina Pali road, at burned area Kipuka Nene. *Kokia* and *Alphitonia* planted on edge of kipuka of very large *Metrosideros* - both fruiting.

In burned area *Setaria geniculata*?, *Physalis peruviana*, *Nicholaena*, *Agrostis avenacea*, *Stachys tarphalea*, *Dichotoma*, *Plantago lanceolata* (roadside), *Lupinus* abundant. *Salvia coccinea*, *Bidens pilosa* less common.

April 12 Puhimau crater

Lehua tree no 4 dead ^{leaves & twigs gone}

no 4 dead

dead leaves still on

no 3 ~~etc~~ (toward crater from 4, 2 m from crater)

dead, no leaves but small twigs still on)

no 5 - living

many twigs dead

ask lower ones but

living growth very

leafy, dark green

healthy looking

upper part very few

dead twigs

no 8 ? (pieces of tag

on ground but

lacking number

tree about in

condition of no 5.

No 7 healthy with

a few dead twigs all

the way up and

leading shoot dead

some flowering

Anemone papuana occasional around Puhimau

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heavy tree now
scattered dead twigs
many epiphytic twigs

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new log
 healthy tree with a few
 scattered dead twigs
 many epiphytic things.

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(continue)

Nov. 17 new log
healthy tree with a few
scattered dead twigs
many epicormic twigs

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around Publications

End/

no. 12 new log
healthy tree ^{dense} with a few
scattered dead twigs
many epicormic twigs

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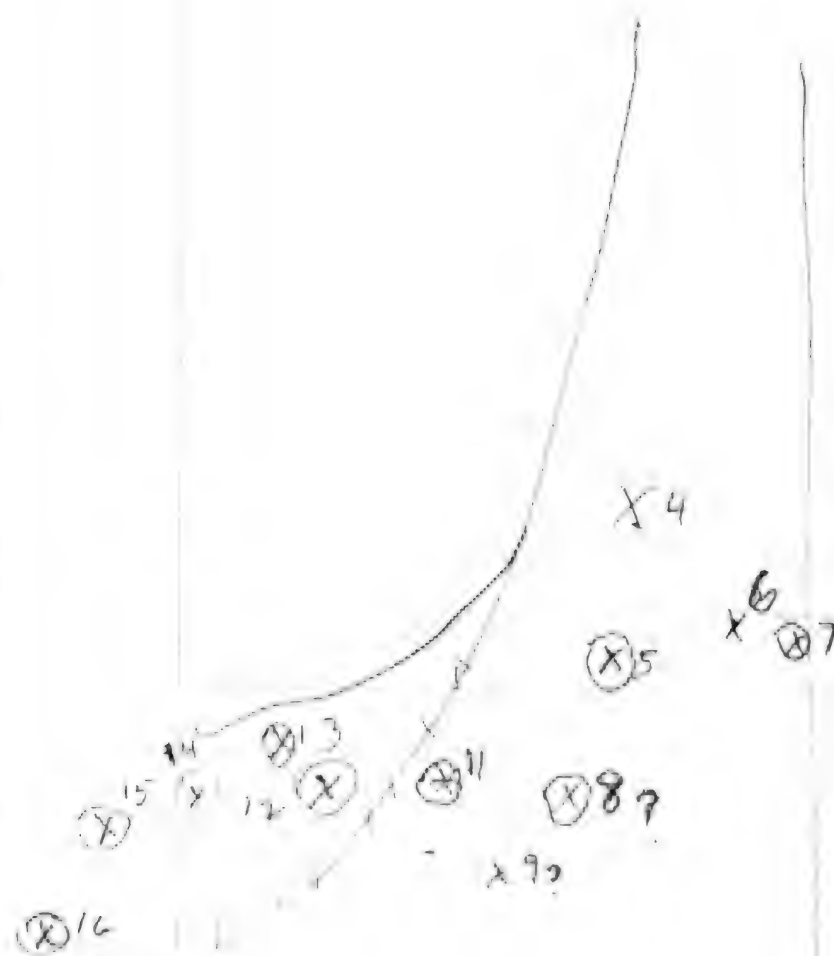
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Cambridge to Stretham & Wicken Fen,
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-Mildenhall, Wangford Warren, Grimes
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No. 11 new tag -
almost dead, with a
scattering of dull reddish
leafy twigs throughout
ext basal branch with most
twigs still alive, but very
reddish dull yellow.

No. 12 new tag
healthy tree with a few
scattered dead twigs
many epicormic twigs.

April 12 Putnam Crater

Schmied tree no 4 dead ^{leaves & twigs gone}

no 6 dead
dead leaves still on

no 3 ~~off~~ (toward crater
from 4, 2 m from crater)
dead, no leaves but
small twigs still on)

no 5 - living
many twigs dead
esp lower ones, but
living growth very
leafy, dark green
healthy looking.
upper part very few
dead twigs

no 8? (pieces of tag
on ground but
lacking number)
tree about in
condition of no 5.

no 7 healthy, with
a few dead twigs all
the way up and
leading shoot dead
some flowering

Anemone papillosa occasional
around Putnam



No. 11 new tag -
almost dead, with a
scattering of dull reddish
leafy twigs throughout
entire basal branch with most
twigs still alive, but very
reddish dull yellow.

No. 12 new tag ^{gone}
healthy tree with a few
scattered dead twigs
many epicormic twigs.

No. 13 Healthy tree with quite a few dead twigs throughout but mostly back on branches no epicormic twigs, rather sparse

No. 14 new top almost dead top dead a few clumps of very red-yellow epicormic twigs healthy sprouts near base

No. 15 Healthy large (10 m) tree, a few dead twigs throughout, some healthy basal branches, but no epicormic shoots.

No. 16 Very leafy, but almost dead except for one healthy basal branch. Branch toward crater slightly more healthy than rest of upper part of tree.

Apr. 13 road to Kipuka Puaulu
cow droppings on road.

April 13 - Kipuka Puaulu

photo
Hibiscus giffardianus in good flower - tree now about 10-12 m tall, another at least 2/3 as high, 4 saplings, unbranched, seen. H. hualaensis good

Two sides of fence bank of park striking contrast. Inside fence Miconia sp. luxuriant, abundant healthy seedlings. Coprosma, Psychotria. No bark damage. No pig rooting.

Outside almost all Coprosma seedlings dead, bark removed in 1-1.5 m. Ferns much less luxuriant, absent in places. Much pig rooting.

fence only a hog fence with one wire above it.

In rooted places tree seedlings are common, locally also Coprosma seedlings, now taller than 20 cm.

Geranium carolinianum v. australe abundant in relatively recent pig rooting, common before grass

(to page 54)

April 12 - Kalanua Pt. Overlook

- 53669 *Dubautia scabra* var. *scabra*
common in edges of
metrosideros forest

April 12 - Puhi-mao Crater,
Chain of Craters Road
in open, degraded
metrosideros forest

- 70 *Vaccinium reticulatum* Sm.
very common

- 71 fungus
~~on~~ on recently dead
metrosideros trunks

- 72 fungus
on dead metrosideros
trunks dead some time

April 12 - Kipuka pens.

along Pali Road
in edges of patch of
tall metrosideros trees

- 73 *Dubautia scabra* var. *scabra*
very common

- 3720' low sprawling shrub,
flowers white.

3750'

dwarf
shrub to 3-4 dm tall,
leaves stiff, bright green,
somewhat ~~glossy~~
glossy, flowers red,
ellipsoid.

weak dwarf shrub,
flowers white.

April 12 - Kipuka Nene,
~~Chain~~ Hilina Pali Road
 in edges of patch of
 tall Metrosideros trees

- 53674 *Kokia drynarioides*
 small planted trees
- (2) 75 *Alphitonia ponderosa* Hb.
 small probably planted trees
- (2) 76 *Bromus rigidus*
 local
- (2) 77 *Digitaria*
 local
- (2) 78 *Setaria geniculata*
 very common in burned
 over area

April 12 - Hilina Pali Road,
 between Kipuka Nene and
 Chain-of-Craters Road.

- (2) 79 *Scaevola kilaueae* Degener
 local in open Metrosideros
 forest on lava flows

April 12 - Hilina Pali
 in rock crevices
 on cliff

- (2) 80 *Nephrolepis multiflora* (Roch.) Fend.
 occasional
- (4) 81 *Sphenomeis chinensis* (L.) Maxon
 occasional, also on coarse
 talus

2925'
 890m

↓
 trees 4 m tall.

trees 4 m tall, fruit green.

depressed to ascending

culms spreading
 to ascending, ~~se~~
 leaves slightly glaucous

3300'
 1000m

depressed shrub,
 fruit black, fleshy, glossy
 (seed sent to Pacific Tropical
 Botanic Garden)

7500 2150'
 460-685m

↓
 leaves very crisped in
 texture.

- 53682 *Galinsoga parviflora* Cav.
 (3) on ledges below top of cliff
 (3) 83 *Galinsoga parviflora* Cav.
 in deep cavities in talus
 (5) 84 *Galinsoga parviflora* Cav.
 on bank above trail, abundant
 (3) 85 *Galinsoga parviflora* Cav.
 on trail below top of cliffs
 (2) 86 *Galinsoga parviflora* Cav.
 on trail part way down cliff

April 13 - Kipuka Puaulu
 in semi-open forest

- (4) 87 *Dryopteris*
 locally common

- (5) 88 *Geranium carolinianum* var. *australe*
 abundant, especially
 where pigs have been rooting
 (1) 89 *Urera sandwicensis*
 rare

April 13 - lava flow just
 below Kipuka Ki
 in tall *Metrosideros* forest

- (6) 90 *Osteomeles anthyllidifolia* Lindl.
 common

April 13 - Mauna Loa Strip Road above
 Kipuka Ki

- (5) 91 *Stachytarpheta dichotoma* (L.) B.K.
 locally abundant in grassland

rays white

rays white

rays white

rays white

rays white

4000'

1220m

large rosette from
 erect rhizome, fronds
 spreading to strongly
 ascending.

weak-stemmed, from a
 thickened root, flowers light pink

slender tree 4-5 m tall,
 young buds only.

4140'

1260m

procumbent mat-forming
 shrub, several m long,
 flowers white.

4200'

1280m

suffrutescent herb or shrub 1-2 m
 tall, flowers medium blue, stems black.

Apr 13 - meadow to right
just after start of
Maunaloa Hwy Road.

Half dozen *Hibiscadelphus*
huahualuensis, several
Poliochloa *hawaiiensis* sp.
2 *Hibiscadelphus* *pyramidalis*
(fls.) planted

Scattered *Myrsine*
lappaceus. Large *Metrosideros*
in and around meadow. Several
small *Pipturus* and
Pisonia cf. *rostrata*, *Sophora*.

Ground cover of *Holcus*
very dense, with *Pteridium*,
Commelina, *Cyperus* *brevifolius*,
Poa *compressa*.

Locally *Geranium*, *Verbena*
littoralis, *Rubus* *penicillatus*,
Hesperis *modicum* (rare)

Plants have rooted intensively
but very locally, esp. under
Sapindus.

1-2 plants *Sapindus* as per

No *Hydrocotyle* seen

in fern cone dropping. fresh

Lava flow (aa) below
Kipukua Ki - partly scrub-
covered, *Dodonaea*, *Myrsine*,
sparse small *Metrosideros*,
occasional *Vaccinium*,
occasional *Polypodium* *pellucidum*.

Part of this flow, or an
adjacent one, has large
Metrosideros, considerable
fairly large *Dodonaea*,
a large leaved, fairly
large *Wikstroemia* is
occasional, *Osteria* *abundant*, an elongate
procumbent form.

Psilotum *nudum* rare,
Carex *walpolei* abundant

6200 - Old palihoehoe slope.

Mosaic of patches of *Acacia*
bore forest, *Myrsine*, *Vaccinium*
scrub and *Deschampsia* *australis*
bunch grass.

Most *Vaccinium* here is
V. peleanum, with bluish
stiff leaves, dark maroon-purple
flowers, bushes to 2 m tall.

Some *V. reticulatum*, bright
green, lower stature.

6640 Lookout

Myrsine variable complex
Vaccinium *peleanum*

6000' Enclosure 10x20 m
on slope, partly open *Styphelia*
scrub with *Deschampsia*
partly *koa* forest.

fenced in ~~1968~~ July 1969

grass much thinner
outside, no *koa* sprouts,
abundant sprouts to 1 m
inside, thick grass.

5000' *Styphelia* scrub with
koa
Pteridium
Vaccinium 2 sp.
Deschampsia
Dodonaea

above this several hundred ft.
a forest of *Dodonaea*

Bet. Kipuka K and K. Puamau
along roadside *Bulbostylis*
capillaris and *Andropogon* sp.

Puhimau Hot Spot

Nephrolepis multiflora (on rocks,
or ground)
Metrosideros collina (on rocks)
Psilotum nudum (on rocks) (rare)
Cyperus poly~~anthus~~^{stachyos}
Limbristylis dichotoma var.
Tricholena rosea
Digitaria chinensis
Bulbostylis capillaris (dead) (rare)
Andropogon virginicus
Patulaca sclerocarpa
Waltheria indica
Paspalum conjugatum
Pteris longifolia
Buddleia asiatica
Impatiens hirta (dwarfed)
OphioGLOSSUM
Arundina graminifolia
Lycopodium cernuum
Sphenomeria chinensis
Ageratum conyzoides
Laccosiphia indica
Vaccinium reticulatum (top of tiny
rock peak)
Elaphoglossum reticulatum (on stump)
Dodonaea viscosa
Styphelia tameiameia
Spathoglottis plicata
Pityrogramma calomelanos
Lindsaea ensiformis
Emilia javanica
Conyza can

Anemone japonica nearby

April 13 - Mauna Loa Strip Road,
Lookout

in scrub alternating
with koa forest on gentle slope

53692 *Styphelia*
common

93 *Styphelia*
common

93a *Styphelia*
common

April 13 - Mauna Loa Strip Road,
in Acacia koa forest

94 *Parmelia*
on horizontal branches of
~~tree~~ tree, common

95 *Usnea*
abundant on branches
and twigs of trees

96 *Vaccinium peleanum* photo.
common in scrub in openings

same - in open scrub
97 *Styphelia tameiameia*
dominant

April 13 - Road to Bird Park
from Kilauea

in open scrub on ash-covered lava

98 *Vaccinium reticulatum* Sm.
common

99 *Nephrolepis multiflora* (Poeb.) Panett
very local in filled lava crack

6650'

1025m

shrub 1.5 m tall, flowers white

shrub 1.5 m tall, flowers white
shrub 5 m tall

6200'

1890m

~~shrub 1.5 m tall~~

shrub 1.5 m tall, leaves
glaucous, flowers maroon

6100'

1860m

shrub 2 m tall, flowers
white.

1750m



dwarf shrub 3-4 dm tall,
leaves bright green, flowers
blood red with green lobes.
tube somewhat swollen.
fronds erect.

April 13 - hot spot below
Puhimau Crater, Chain of Craters Road
nearly bare hot earth
with many fumaroles

3600'
1100 m

fronds erect

leaves curved, prostrate,
stems prostrate

53700 *Nephrolepis multiflora* (Roxb.) Jarrett
in crack on low stump

01 *Fimbristylis dichotoma* var.
abundant on

02 *Ophioglossum*
locally common around
mouths of fumaroles

03 *Pteris*
around mouth of fumarole

04 *Pteris*
around mouth of fumarole

05 *Pteris*
plant around mouth of fumarole

06 *Lindsaea ensiformis*?
very rare, mouth of fumarole

07 *Nephrolepis multiflora* (Roxb.) Jarrett
in local dense stands,
very common

det. Jarrett, 1976 fronds erect

08 *Nephrolepis multiflora* (Roxb.) Jarrett
abundant around a fumarole
in cooler ground near edge
of open area

det. Jarrett, 1976

April 14 Kalapana Beach, lava
in freshwater pond back of
dunes

0 m

09 *Egeria densa* Bail
abundant

loosely rooted or floating, flowers
white, immersed

April 14 - Road to Kalapana
from Oloa.

Cecropia obtusifolia has
spread along road for
some miles from Oloa (76)

Melochia umbellata also.

Several small *Cecropia* along
road. 4m tall in patches
15-20 m from road. Larger
branched one farther on and
a colony at 77.6 One large one
at 78.7 80. several fair size
side of road.

83.9 Pahoia

photos

Original vent of 1955 flow
(where old house & store were)

Rocks now light gray with
a luxuriant growth of
Stereocaulon vulcani

to 3-4 cm tall.

- a *Nephrolepis multiflora*
- c *Arundina graminifolia* (fl.)
- c *Metrosideros collina* (5115 m) (fl.)
- c *Andropogon virginicus*
- o *Melastoma malabathricum* (fl.)
- a *Rhacomitrium* (very sheltered spot)
- a (common) very common at cracks
- o *Psilotum medianum* (fl.)
- 2 *Eupatorium riparium*
- 2 *Sadleria cyathoides* (sheltered)
- 2 *Pluchea odorata* (fl.)

a number of others

species in disturbed area along rd.

Mimosa pudica

Cassia leschenaultiana

Nermodium canum

Lycopodium complanatum

Machanea angustifolia

Sacciolepis indica

Spathoglottis plicata

Pityrogramma calomelanos

(spreading up slope along path)

lower end of this flow has
no lichens or other plants.

At Papaya factory

quite a few seedlings *Cecropia*

to 1-1.5 m on road embankment

1 *Manihot glaziovii* sapling

2-3 m unbranched.

photo

Upper road across Kamaile Flow 1955

photo of kipuka

Kalapana Beach

Coconuts planted ~~at~~ on most
of dunes. *Ipomoea pes-caprae*

Fresh water pond seaward
of road has abundant *Egeria*

photos

Place where flow cut road -
lava flowed 100-200 m down road.
No noticeable effect on vegetation
for more than 1 or at most 3 m
from edge of flow.

near edge of flow

Lantana camara

Waltheria indica

Chrysopogon

Vernonia cinerea

Tephrosia piscatoria

Doryopteris decurva v. *decurva*

Cassia leschenaultiana

Tricholaena

Emilia javanica

Desmodium triflorum

Bidens pilosa

Indigofera cf. suffruticosa

seedlings of

Waltheria

Cassia

Chrysopogon?

Doryopteris and *Nephrolepis* very common in crevices in road-cut.

Pahoehoe lava entering sea in flow that spreads laterally along foot of low sea cliff, flowing onto fresh black sand beach. Shallow greenish water out about 100m.

Lava oozing out along beach side of flow, glowing, waves breaking on seaward side of flow, occasionally coming clear over. Water boiling in pockets.

photo

p = patches of ash in depression

c = cracks (a few plants also in holes) 65

Lava flat to 100m back of cliff where lava is entering sea -

- o *Portulaca* (p)
- a *Fimbristylis cynosu* (c+p)
- c *Waltheria indica* (c+p)
- Ec *Euphorbia thymifolia* (p)
- o *Pluchea odorata* (c+p)
- n *Digitaria henryi* (p)

Lava flat between road and 100m from edge

- c *Vernonia cinerea* (p)
- vc *Heteropogon contortus* (c+p)
- o *Pluchea odorata* mostly ~~near~~ near sea
- a *Nephrolepis multiflora* (c) (holes)
- a *Waltheria indica* (p+c)
- vc *Chrysopogon aciculatus* (p+c)
- c *Desmodium triflorum* (p)
- o *Passiflora foetida* (p)
- a *Cassia leschenaultiana* (p)
- n *Dactyloctenium aegyptium* (p) near sea
- n *Paspalum conjugatum* (c) near sea
- o *Portulaca* (p) near sea
- n *Emilia javanica* (p)
- n *Dodonaea viscosa* (c) no plant seen
- n *Styphelia tameiameia* (p) one clump seen
- n *Tephrosia piscatoria* (c+p)
- o *Fimbristylis hawaiiensis* (p) near sea
- o *Lantana camara* (c) away from sea
- c *Tricholaena rosea* (p+c) away from sea
- a *Bulbostylis capillaris* (p) away from sea

Doryopteris
flexibilis (p)
decurva (p)
Conyza bonariensis (p)

Apr. 14 - where 1971 flow
cut Kalanianaʻohi - Kilauea Road
below Naʻale Forest
in dry low scrub near edge
of lava flow

53710 *Indigofera tinctoria*
at edge of lava (survived at
exact spot where *suffruticosa*
was killed)

(11) *Indigofera suffruticosa*
near edge of lava flow
(dead branch killed where *tinctoria*
survived)

same - ^{lava} plain for 1 mi & from
sea

(12) *Portulaca*
occasional in ash and under
pockets on pahoehoe flow.

(13) *Fimbristylis hawaiiensis*
occasional in ash pockets on
pahoehoe flow

(14) *Passiflora foetida* L. var.
occasional in small depressions
in pahoehoe flow

April 14 - core at head of ¹⁹⁵⁵ Kamaili Flow
near Pahoa

on surface of ~~lava~~ pahoehoe lava

(15) *Chacomitrium lanuginosum*
very rare, only 2 tufts seen in sheltered spot

(16) (moss)
very common

flowers salmon or old rose
to

shrub 1 m tall, fls salmon or
old rose

fleshy, bronze, subterete leaves,
fusiform roots, rose-pink
flowers, closed at 2 pm

rounded cushions

no capsules seen.

Lambucus mexicanus
naturalized several places
along Volcano Rd. and also at
Kapoho.

Casopia on road to Kapoho
where *Albizia* is.

Area near ¹⁹⁷¹ Kapoho
lava flow
4 discernable belts of vegetation
between sea and road - distance
of about a mile, old Kapoho.

for
list
see
p. 105

1. near sea, from cliff back 100 m
or so. *Fimbristylis cymosa* is very
noticeable but sparse, with
a few other plants, especially
in sheltered spots with some
ash accumulation.

2. inland from this a belt with
extremely sparse vegetation.

3. a wide belt of sparse
vegetation with *Nephrolepis*
prominent in cracks, *Bulbostylis*,
Waltheria, *Cassia* in patches
of ash in depression, *Heteropogon*,
Vernonia, etc. also in cracks.

4. a somewhat steeper slope,
about 100-200 m wide below
road. This has essentially

the same species as belt 3 but
the vegetation is closed and most
species are more abundant.

Possibly a few additional ones not noticed

April 24 - Roland, S.W. base
of Bull Run Mts 2 mi. NW. of
Thoroughfare Gap

in small swampy area
between two streamlets in
deciduous forest

53717

① *Vaccinium atrococcum*
very local

② 18

Vaccinium atrococcum
very local, bank of stream

A few wild flowers
in bloom

Dentaria laciniata

~~Thalictrum~~

Thalictrum thalictroides

Viola sp.

Languina canadensis
(almost past flowering)

Lilae caroliniana

Lindera benzoin

Ansaema atrombens

shrub 1.5 m tall, branchlets
brownish; corollas greenish
white.

shrub 3 m tall, branchlets
green; corollas cream white.

June 25 — trip to Finland
Left Washington about 6:30 a.m.
missed connection in N.Y.

Left N.Y. at about 12:40 a.m.,
arrived London 12:15. Left London
Heathrow at 1:50 p.m. High clouds
and bad visibility.
arrived Helsinki about 5:45.

Helsinki is built on a
substrate of pink granite
variegated with black, outcropping
in low rounded bosses here
and there.

Left Hotel Vaakuna at 11:20.
Toured Helsinki.

The Libelius monument
in Libelius Park is outstanding.

Drive from Libelius Park
to follows the
east side of Lake

through a mosaic of mixed
needle-leaf evergreen forest and
broad-leaf deciduous forest
and cultivation on a
rolling expanse of low
granite bosses with
depressions filled with
morainal material, this
cultivated or in meadow
with many wild-flowers.
Much of the forest is a
transition between broad
leaf ~~deciduous~~ and needle-

leaf. Regeneration in
openings seems mostly
Betula, *Populus*, *Alna*, *Falix*,
which are the principal
genera in the broad-leaf
forest. Conifers are
Picea abies, *Pinus sylvestris*.

Saarinen estate

Very pleasing architectural
and landscape complex.
Outdoor sculpture exhibit—
very modern, many pieces
so far out or so artificial as
to be not pleasing, but
some superb examples.

Acer platanoides

Syringa spp.

and many smaller ornamental
shrubs and herbs,
in addition to the pines, birches,
spruces, etc.

In surrounding ^{wood} forest a
ground cover of *Vaccinium* spp.

Trip to Jyväskylä through
a continuation of the rolling
worn-down granite ~~at~~
catena of knolls of hard
rock and depressions with
morainal sand and gravel.
Total relief probably not
more than 30 m or so. Same
improved gradient of forest types.

Wild or semi-wild trees:

Pinus sylvestris

Picea abies

Betula alba (s.l.)

Populus tremula

Sorbus aucuparia

Alnus

Acer pseudoplatanus

Acer platanoides

Salix

June 20

Laarjaves

Luhmasaari

Pine-berch forest with
ground cover of *Vaccinium myrtillus*,
V. vitis-idaea, with

Platanthera bifolia

Geranium sylvaticum

Veronica chamaedrys

Linnaea borealis

Melampyrum

Pyrola rotundifolia

P. uniflora

P.

Lycopodium complanatum

June 30 Pyhäjärvi Natural Park

Mixed dense forest -
broad-leaf and needle-leaf
trees to 30 m tall 1-3 dm dbh.
trees 1-3 m apart. Has been
no cutting in 300 years, but
occasional fires.

Pinus sylvestris

Picea abies

Populus tremula

Betula pubescens

Sorbus aucuparia

Alnus

- dense ground cover,
 a of *Vaccinium myrtillus*
 c *V. vitis-idaea*
 o *Rubus saxatilis*
 lc *Thelypteris dryopteris*
 r *Athyrium*
 c *Maianthemum*
 r *Calluna vulgaris*
 r *Trentalis europaea*
 r *Salix*
 lc *Convallaria majalis*
 lc *Solidago virgaurea*

Large old pines
 from before fires, some dead.

Acc. Prof. Mikula the
 large pines *sylovestris*
 (up to 4 dm dbh), some of
 them dead, are relicts from
 before the 3 forest fires.
 After the fires birch, aspen
 and perhaps some pine
 came up. The mixed forest
 thus established was
 gradually invaded by
Picea, which, without
 further fires, will gradually
 replace the birch and aspen,
~~gradually~~ then even the pine,
 forming a dominantly
 spruce forest. In the
 present forest, fairly
 well along in this succession

but still definitely
 a mixed forest, has
 many fallen trees, of
 all sizes. These are
 covered with moss,
Vaccinium, etc.

July 3 - Left Jyväskylä at 7:30 pm.
 weather very clear.

For the first part of the
 trip the proportion of forest
 in the mosaic is as much as
 90%, with cleared areas near
 lakes and roads. Toward
 Helsinki it decreases to
 perhaps 75-85%, still largely
 following roads. Lakes ~~are~~
 scarce, forest more unbroken
 around them. A large bog -
 filled in lake. Proportion of
 forest becoming less, but still
 more than 50%.

July 4 Left Helsinki at 11:50 am. for
 Amsterdam ~~via Copenhagen~~.

Mosaic of forest, grain fields and
 lakes, perhaps 50-45-5%, the
 knolls wooded, the flat ground
 cultivated. Some of the patches
 of wood thin, with rock
 showing through, more as flight
 progresses, also proportion of
 cultivation increases to perhaps 50-60%.
 To b. 20.

June 30 - Pyhäjärvi Natural
Park, near Saarijärven
in semi-open managed
~~Picea-Pinus forest~~ Pinus-
Betula forest with dense
ground layer

53719

Linnaea borealis L.

locally very common

20

Lycopodium clavatum L.
very local

July 2 - Jyväskylä,
university campus

21

Caragana

planted as an ornamental

July 25 - Sunderland Cascades
low beech cliff with
moss and ferns, beside waterfall

22

Woodia

July 31 - Roland Center,
s.w. slope Bull Run mts.,
2 mile n.w. Thoroughfare Gap
Fauquier Co.

②

23

*Galinsoga*weed near dwelling,
along garden fence

Aug. 4 Sleepy Hollow, New York

①

24

Galinsoga

in weedy garden patch

trailing, scapes erect,
flowers pinkish-white, fragrant.
rhizomes superficial but
buried in moss layer,
not very extensive.

shrub 2.5 m tall with
many stems from base.
fruit immature

Franklin Co. Mass.

rays white.

rays white

July 4 flight ctd.

12:05

Then proportion of water increased very much.

12:08

The land gradually changed into an archipelago of a myriad of small islands. These are mostly very thickly wooded and rocky.

12:11

Then lining over with scarcely any vegetation.

12:14

Then the islands get larger - the largest partly cultivated or grazed, partly rocky and thickly vegetated. Several small towns.

12:15

The archipelago ends abruptly. Another ahead in distance.

12:17

This is rather the Estonian coast similar mosaic to southern Finland. Larger proportion of cultivated land and of water than most of the ~~far~~ southern Finnish landscape, but proportion of forest increasing southward.

12:40

Visibility becoming very poor.

12:58

A large city.

Land mostly cultivated, sea a short distance to right.

1:07

A large lake, then the sea but no visibility - fog.

1:10

Land glimpsed dimly through the fog.

12:16

Series of sand flats and bars, ending in curved section of barrier beach.

12:26

Then open sea. Crossed Dutch coast - section of barrier beach. Completely cultivated landscape away from coast.

12:29

Turned sharp right.

12:30

Crossed a complicated estuary with sand flats.

~~Crossed B.~~

Most of flight from Amsterdam to U.M. over clouds with no visibility. However, crossing western Greenland ~~was~~ visibility was reasonably good. The ice-caps seemed very flat, but along western margin a rugged mountain range protrudes through it, with peaks and slopes free from snow and ice. Western side has very little ice or snow, but in the fjords ~~between~~ ice is abundant, also outside in Davis Strait. Ice blocks are not evenly distributed. Certain patches have them very dense. In sparser areas they seemed to be more or less linearly ~~rather~~ arranged east and west.

1971 New York

July 23 - ^{about} 2.5 miles west of
Sweden Center, just
north of Jackson Pt.

Small hillock about
8-10 m high surrounded
by cultivated fields.

Hill is apparently an
erosion remnant of
bedded limestone containing
abundant fossils.

Collections made and
delivered to Gus Cooper,
U.S.N.M.

Orleans Co.

July 25 Leverett Lake Ovens,
head of Rattlesnake Gutter
2 large charcoal ovens
near a beautiful stream
and small waterfall.
Ovens have been in use for
150-200 years, abandoned 9 years ago.
Mixed second growth
with *Quercus rubra*, *Fraxinus*,
Acer rubrum ~~nigrum~~ *nigrum*.

Small weedy meadow.
Alnus thickets along stream.
Stream is Sawmill River.

Rattlesnake Gutter

Gorge with mixed
hemlocks, yellow birch,
Quercus prinus, *Acer rubrum*, *A.*
nigrum, white birch,
Betula lenta, *Pinus strobus*,
Quercus rubra, *Tilia americana*, *Fraxinus*
with *Kalmia latifolia*,
Hamamelis, *Acer spicatum*,
Rubus odoratus, *Tilia americana*,
Fraxinus, *Acer pennsylvanicum*,
Rhododendron cf. *nudiflorum*.

Good diversity of habitats.

The gorge is about 3/4 mile
long, opening out below
into a somewhat dissected flat
~~area~~ with white pine
and mixed northern
hardwood. A number of
owners, possibility of preservation.

Lunderland Cascade -
(Mt. Toby quadrangle 7 1/2' 4594)

Small stream flowing
over flat beds forming
3 waterfalls about 15-20 ft
high. Sedges with abundant
liverworts, ferns -

Asplenium rhizophyllum
on a low breccia cliff, *Woodsia*?
40 acres northern hardwoods
nice little marsh. Possible
gift to C.R.W.C.

Projects of Conn. R. Watershed
Council.

Wharton Brook State Park
above New Haven near Wallingford.
White Pine plantation. Very
intensively used.

Aug. 4 - Left Dulles 5:45 p.m.
 Aug. 5 Arr. Paris 7:50 a.m.
 Left Paris 11:00 a.m.
 Arr. Athens 2:45 p.m.
 Lv. " 3:30 p.m.

Hills around Athens
 Airport are gray-brown,
 very dry, shrubby
 vegetation sparse on
 slopes, denser on relatively
 level hill-tops and shallow
 ravines.

Golf course very green,
 with open stand of stone
 fences.

Arr. Beirut 3 a.m.
 Hills back of Beirut
 are generally wooded or
 heavily bushy, but
 very much built upon.
 Buildings nearly to tops.

Tjibajung - arr. just before
midnight Aug. 11
ornamentals

Pinus merkusii
Spathiphyllum
Cupressus
Acalypha wilkesiana
Rhoeo spathacea
Calceolaria scutellarioides
Zinnia elegans
Cordyline fruticosa red
Plumeria obtusa
Catharanthus roseus
Caribea pentandra
Zithonia div. sifolia (spontaneous)
Euphorbia pulcherrima
Antocarpus altilis
Mussaenda philippica cv. *Dona Aurora*
Bougainvillea glabra
Allamanda henderoni
Allamanda cf. cathartica
Caryota urens
Alternanthera betjieliana
Cycas circinalis
Filicium sp.
Gardenia jasminoides
Delonix regia

Sangeh -

Grove of *Dipterocarpus* of
pure stand, all ~~ages~~ sizes
up to about 1 m dbh.

35 m tall

2 m ^{closed} shrub layer of
Psychotria, *Cassia*,
Aglaonema, *Ardisia*, etc.
Piper on some tree trunks.
Epiphytes on highest branches.

Perhaps 10 ha, temple near center.
Highly intricate masonry and
sculpture, covered and made
green by moss, hepatics, ferns,
Pilea, and other plants. Ground
around temple with *Axonopus*
compressus.

In forest the litter is dense,
mostly *Dipterocarpus* leaves,
very few herbs except a few
ferns along trails. *Clatostomum*
occasional.

Many very tame monkeys
(macaques?) gray.

Aug. 21 - trip from Canberra etc

~~Rolling~~ Rolling to hilly country
woodland - open scrub forest
with open acacia spp. shrub layer.

Through Queanbeyan

then "table-land", rolling
slightly less hilly - very open to
semi-closed rather taller Eucalyptus
little undergrowth.

Cleared about 1880[±], some
regrowth. Badly eroded hills,
bedrock.

Around Bungendore is
a large basin with internal
drainage, mostly open.
Lowest point is Lake George -
an intermittent lake. Water
enough for water sports in
rainy periods. Dry, ~~supposed~~
subposed by evaporation, in
dry periods - then bed grazed by sheep.

then low-hilly country, closed
to open Eucalyptus forest,
west of Bungendore.

then another basin, mostly
open.

Rocky scrub with -
Mannar Creek nr of Braidwood
& of Bungendore.

- several Eucalyptus spp.
incl E. pauciflora - snow gum -
parallel veined lvs.

photos of *Panicum* infl.
masses caught in fences.

then very flat mostly
open country, a few
scattered Eucalyptus, some
Pines planted along fences.

Warri Bridge, Shoalhaven R.

~~Near Braidwood~~

granite river bed with
Leptospermum. Ravine walls
with mixed scrub, some
Eucalyptus trees. *Lomandra*
(aff. *Xanthorrhoea*) "mat brush"

Acacia sp., Leptospermum
Terrace wooded fairly densely,
surrounding country
cleared woodland.

Braidwood.

Salix along creeks is all
introduced.

No native deciduous trees.

low hills bet. Dummer
Dunera & Marlow

Acacia botryoccephala

Pteridium

roadside in Eucalyptus
forest.

Between Charleyong and Nerrig
wooded with Eucalyptus but
large cleared areas - woods fairly
thick but not very tall.

Nerriga is in a large rather flat cleared basin surrounded by wooded hills.

Endrick River - in hills covered by Eucalyptus forest, river lined by Casuarina cunninghamii, 10-15 m tall, shrub layer of Leptospermum, Acacia spp.

Hill with Eucalyptus ^{vifera} forest with some Casuarina sp. & an irregular shrub layer of Acacia sp. in flower.

Upper part is flat eroded sandstone with scrub forest of Eucalyptus ^{vifera} Acacia &

Hakea, Leptospermum ^{sp.}, Lepidospermum ^{sp.}, Bornea (Ruta), Casuarina ^{sp.}, Grevillea baueri, Dillwynia, Grevillea sp. Leucopogon

Oxal, ~~Restia~~, Lomandra flexilis, Caustis, Gleichenia rupestris, Stylium

Platanace lanceolata

W. end of Pigeon House Range

Pyroseris

Hymenophyllum

Leucopogon cf. lanceolatus

Cersora

Along Pigeon House Range
heath-like veg. with scattered Eucalyptus. Thin soil on sandstone

Tianjana Falls ^{1600'}
where Tianjana Cr. falls over a very high ~~cliff~~ cliff. Sandstone Heath-like vegetation with tall Leptospermum with scattered Eucalyptus along creek banks.

Restia

Lepidospermum?

Leucopogon sp.

Acacia sp.

Hakea

Bet. Tianjana Falls
forming generally closed Eucalyptus forest.

2 mi. N. of ~~Wattle~~ Milton
Garrungah Cr.

Kennedya ^{sp.} unbecunda Vahl.

Commersonia fraseri J. Gay

Goodenia ovata
shrub

Kialoa State Forest

Cochubry Creek, S. of Termeil

Gleichenia

thick Eucalyptus forest with ^{some} second story of other genera. Livistona australis occasional.

Away from creek the undergrowth thins out and is sparse.

Just north of Batemans Bay
in this forest

Macrozamia
abundant

Pomadourus umbellata

Clyde Mt. upper slope 2400'

Cyathea

Euryphloeus moorei

in moist Eucalyptus forest
with thick undergrowth
tree ferns common

Aug. 21 - Manan Creek,
east of Bungendore, northwest of
Braidwood

53725

in open forest on rocky slope

53725

Eucalyptus pauciflorus

occasional

①

②

26

Eucalyptus

occasional

Aug. 21 Low hills between
Durrant Duna and Marlow
in roadside in *Eucalyptus* forest

①

27

Acacia botryoccephala

occasional

②

28

Pteridium aquilinum

common

Aug. 21 - Warri Bridge,
Shoalhaven River

②

29

Leptospermum

occasional on irregular
granite river bed, submerged
at high water

Aug. 21 - west end of
Pigeon House Range, east
of Endrick River

on ~~flat~~ dissected flat
bedded sandstone

①

30

Platysace lanceolata

rare

①

31

(lichen)

very common on flat surfaces

2000 -

2200 ft.

640 - 670 m



small tree with very
light smooth bark.
small tree with rather
dense round crown.

shrub, flowers light yellow.

rhizome deeply buried,
about 5 cm thick.

slender shrub 1 m tall.

dwarf shrub 0.5 m tall

(over)

- 53732 *Casuarina distyla*
 (2) common
- (2) 33 *Caustis*
 occasional, very local
- (2) 34 *Hakea?*
 with m.-H. basket
 common
- (2) 35 *Cassytha*
 occasional, entangling
 other plants
- (1) 36 *Boronia*
 m.-H. basket
 very local
- (1) 37 *Grevillea baueri*
 occasional
- (1) 38 *Dillwynia*
 with m.-H. basket
 occasional
- (1) 39 *Stylidium*
 occasional, local
- (1) 40 (cyp.)
 locally common
- (1) 41 *Lomandra flexilis*
 locally common
- (3) 42 *Gleichenia rupestris*
 with m.-H. basket
 very local in roadside
 ditch
- (5) 43 *Pyrosia*
 on road cut
- (3) 44 *Leucopogon cf. lanceolatum*
- (2) 45 *Hymenophyllum*
 on road cut
- (1) 46 *Persoonia*
- (2) 47 *Leucopogon*
 locally common on flat surfaces
- (3) 48 *Olax*
 occasional

shrub up to 3 m tall,
 erect.

erect

shrub, flowers white

purplish brown

dwarf shrub, 3-5 dm tall,
 flowers pinkish white.

shrub to 1 m tall, flowers
 crimson

dwarf shrub, flowers orange.

rosettes rather glaucous.

sterile; very distichous.

forming a dense mat

shrub, flowers white.

fruit green, slightly oblique.

dwarf shrub 2 dm tall,

flowers pinkish white.

slender erect shrub

about 1 m tall, yellow-green, flowers
 white, buds yellow.

Aug. 21 - ~~at~~ above Tianjana Falls 1600 ft.
 Tianjana Creek, west of Lamphar 490 m
 in irregular scrub
 in open forest on sandstone

53749

Pectis

locally common on ~~sandy~~ sandy
 stream margin

erect

③

50

Banera

very local on sandy
 stream margin

weak, tangled.

①

51

Hakea

occasional

shrub; flowers white

②

52

(sedge)

common

culms terete, erect.

①

53

Epacris Trichilia lirta L.

occasional

flowers white

⑦

55

Exocarpos

rare

strictly erect shrub
 2.5 m tall; young growth
 yellowish; sterile.

Aug. 21 - about 2 miles north
 of Milton, south of Yattergatta
 in roadside scrub in
 open Eucalyptus forest

③

56

Kennedia rubicunda Vent.

occasional

~~rough~~ twiner, flowers
 dark maroonish red.

③

57

Gordonia ovata

flowers bright yellow

①

58

Olearia

shrub; rays white, disk yellow.

②

59

Commersonia fraseri f. Gay

common

shrub to 2-3 m tall;
 flowers white.

with
 V. Krajina

Aug. 21 Kialoa State Forest.
 Cockwhy Creek, south of Termeil

①

60

Gleichenia

erect

Aug. 21 just north of
Bateman's Bay

53761 *Pomax umbellata*
in thin forest
D. Wall
H. Lichler

Aug. 21 - Upper slopes of
Clyde Mt.

62 *Eucyphia moorei*
occasional in thick
moist ~~for~~ Eucalyptus forest
with tree ferns
with
R. Hoogland

Aug. 22 ~~Tiddabilla~~ Tiddabilla
Nature reserve

63 *Cheilanthes tenuifolia*
common on open rocky, grassy
slope, formerly cleared for pasture

730m

small tree, leaves very
glaucous beneath.

small erect tufts.

Aug. 31 West side of Kahului Bay
 range of consolidated
 dunes 300 ft wide, with
 thin sand cover
 irregular patches of
Leucaena & *Prosopis* with
 open dune rock and sand
 between them. *Heteropogon*
 around clumps of bushes.

In openings

Scaevola coriacea

~~*Heteropogon*~~

Heterotheca grandifolia

Scaevola tanniana

Lupacharta integrifolia

Nama sandwicensis

Imbristylis cynosu

Waltheria indica

Leucaena leucocephala

Aug. 31-32 Kula

There has been an extended
 drought - Waikamoi reservoir
 is down to about 2 ft of water.
 Water rationed to 6 hours a
 week.

Stadleranthus parviflorus

Anagallis arvensis

Lido fallax

Bidens

Cenchrus echinatus

Lantana camara

Tridax procumbens

Many dead *Achatina fulica*,
 a very few of a narrow-spined
 native shell(?) and on landward
 side of dune, in upper edge
 of cemetery, many of a
 low-spined ~~on~~ medium
 sized ~~native~~ species(?), the
 last two collected.

1. *Euglandina rosea*

2. *Eulota similis*

both det. by Yoshio Kondo

who remarked on how soon
 the *Euglandina* (introduced
 about 10 years ago, to control
Achatina) had become fossil.

Aug. 31 - West side of Kahului Bay.

On slopes of poorly consolidated calcareous sand-dune, with thin ~~loose~~ loose sand locally.

53764

Nana sandwicensis

common in crevices and pockets of loose sand in open areas

①

65 *Anagallis arvensis* L.

local in edges of bush patches

①

66 *Passiflora foetida*

rare in edges of bushy patches

①

67 *Sida fallax*

very local in small openings

①

68 *Bidens mauiensis*

common in crevices in open areas

④

69 *Lipochaeta integrifolia*

very common in open areas

①

70 *Scaevola coriacea*

common in open areas

Aug. 31 Haleakala Ranch pasture below Upper Kula Road, Kula, west slope of Haleakala

[in gently sloping pasture land]

④

71 *Abutilon grandifolium*

occasional, edge of Acacia thicket

⑥

72 *Xanthium*

local colony on flat low place

15-30m.

flowers very pale pink, plant prostrate.

seen in dry condition only, clearly behaves as an annual here, climbing, bracts purplish, fruit purplish when ripe. prostrate, flowers faded orange.

main stems prostrate, twisted, scape erect to ascending, flowers yellow.

forming gray mats up to 3-4 dm long; not flowering at this season.

prostrate shrub, ^{rooting at nodes,} forming very loose mats; leaves stiff coriaceous, flat, tending to be held erect; flowers ~~dull yellowish~~ ^{pink} on thick parts outside, thin parts and inside ~~of~~ of corolla white; fruit ~~fleshy~~ shiny black.

1000m

shrub ² m tall, flowers orange
aromatic herbs ^{odor rather like a shrub,} up to 1 m tall, large ones branched.

108

1971 Virginia

Sept 18 - Roland

$$r = \frac{1}{2} \sqrt{2} \approx 0.707$$

43773

Wolffia

edges of artificial pond, or mud

Two or three submerged and semi-submerged aquatic plants common in shallow parts. Wolffia ~~and~~ not met at edge of ~~the~~ pond, at least on leeward side.

Fauquier Co.

109

Oct. 15 - flight to St. Louis
crossing Blue Ridge somewhat
south of Front Royal (3100') (N.)

Patches of forest on Piedmont
show no significant fall
coloring. Some shows up
on Bull Run Mts., but not much.
A little in Blue Ridge, more
as we go west, esp. on a high
complex in the Shenandoah
Mts. (?), but increasing
irregularly, and not
altogether with elevation,
as the most conspicuous
is an area of moderate
elevation in West Va.

Moderate in W. Ohio.

Haziness is what appears
to be smog. A translucent
haziness, noted in eastern
Ohio, increasing irregularly
till about W. Ohio or Indiana
ground is obscured completely.

Oct. 24 - trip to Roland

Route 66 bet. Beltsville and
Gaithersville

Color change near its height -
Nyssa deep scarlet
but leaves largely gone.

Quercus generally still green
except Q. palustris which
is greenish brown.

Fraxinus butter yellow
changing to deep purplish or
maroon.

Liriodendron bright light
chrome yellow.

Larrea greenish yellow
to deep chrome yellow to
somewhat brownish.

Acer rubrum light green
to butter-yellow to somewhat
red.

Cornus florida dull deep
crimson to maroon.

Rhus glabra + typhina
vermillion to scarlet,
some plants still partly green.

Cercis yellowish or
greenish yellow.

Robinia yellowish green.

Sassafras greenish yellow
through bright yellow, orange
to scarlet.

Oct. 30 - New Orleans

Mississippi River at Audubon Park - belt of *Sesbania* sp. along ~~river~~ levee margin - about 3-4 m tall. At this season leafless, abundant pods. Looker purple from a distance but close up not evident where the color comes from. Pods are brown. Some said to remain on until March.

Oct. 31 Belize Br. Honduras

Much natural or semi-natural vegetation within easy reach of city. Mangroves on way from airport.

About 20 mi[±] south of Belize a large area of what appear from a distance to be limestone mogotes.

Large cays just south of passage through ~~group of~~ ~~cay~~ ~~lagoon~~ scrub forest with tall dead snags and trunks protruding up to twice the height of green vegetation. On one are a couple of large buildings.

North of passage are about 12 small cays. 7 first has

a number of buildings of all sizes. A few Cocos about as tall ~~as~~ twice as tall as buildings. There are 4 houses no shrubs, some grass.

In the others there is only 1 Cocos, rather tall. Veg. is mostly mangroves or others, in very poor shape, taller trees mostly dead. Several small remnants are only tangled dead mangroves, water between. Only one of the other 11 cays ~~has~~ has a house, the same one with the Cocos. The entire islets are affected by the hurricane.

Nov. 1 Robertson Island - scrubby forest much damaged by Hurricane Hattie - Many old bare trunks rising above low scrub or scrub forest. An eagle's nest in one old trunk, one eagle sitting on it. 2 other bald eagles sitting on old snags one near the nest.

On a remnant of a mangrove cay north of Simmons Cay 3 brown pelicans on old dead mangrove root crowns.

On cay immediately north-west of Simmons Cay another

eagle's nest on top of a broken-off tree-trunk.
One tall coconut palm on Limmers Cay, also an abandoned house, rather skeletonized.

Occasional flying fish.

The cays near Tobacco Pass have much ~~more~~ taller and more luxuriant vegetation with much fewer dead tree-trunks. Clearly less influenced by Hurricane Hattie.

At 4 p.m. entered the southwest pass of Glover's Reef.

Southwest Cay I is covered by tall coconut trees with only one small clump of shrubs in about the middle of the top of the beach on the pass side. Closer up some other bushes can be seen. Many seedling coconuts.

Southwest Cay I has dense undergrowth on northeast peninsula.

Nov. 2 - Long Cay

ms. apparently wrong inf. Fogged with Vapona "dimethyl tulanide" bet. 8:30 and 9:00 a.m. Said to be the most harmless insecticide available. No apparent effect on dragon-flies - Libellula that are flying around in some numbers active ingredient.

from label on bottle { Chlorinated Terphenyl 40%
Aromatic petroleum derivatives
2,2-Dichlorovinyl dimethyl
brest ingredient phosphate

contains 60% Chlorine.
"Kill Flies Fast"

Fogged yesterday and today, otherwise about once a month.

Shape of peninsula changed by Hurricane Francella 1969 Sept 2 years ago. Truncated just beyond coconut trees beyond dining room. Seaward coast north of beach-rock straightened out by this storm.

Irregular rubble flat beyond coconut trees on peninsula built up in last 2 years.

Along lagoon shore a considerable row of piles up *Thalassia*, *Syringodium*, *Sargassum*

Amphipods and isopods in it.

bottle (Collected mosquitoes in tent, Chrysomelid in throat of *Hymenocallis*, scarab around light, also other beetles. *Lepisma* in tent.

Colonists on new land at end of peninsula.

Sesuvium portulacastrum

Crocanthus erectus

Euphorbia mesembrianthemifolia

Coccoloba uvifera

Tournefortia graphalodes

Coconut trees at north-east end have pinna tips brown.

Thalassia - *Syringodium* beds from 0.5 to 2 m depths perhaps 2/1 *Thalassia* to *Syringodium* forming a dense deep sod, the blades very conspicuously covered by epiphytic *Melobesia* - *Fosliella* and other small epiphytes. *Diadema antillarum* very common at 1 - 2 m depths, a few of a short-spined large echinoid and a single large sea-anemone, all living in the sand. Occasional spots of bare sand about 3 dm diam. This is restricted to an area around pier and southwest of it, (Monarch butterfly around *Hymenocallis* fl.) several seen. and a spot not far from peninsula. Most of the sandy bottom lagoonward of Long Cay is a pure dense sod of *Thalassia*.

Plants seen (+ collected)

a *Cocos nucifera* (general ex. pen-
insula)

Hymenocallis littoralis

abundant on back slope of
boulder ridge near beachrocks,
planted along paths in
coconut grove.

- l c fl. *Conocarpus erectus* open
l a fl. *Tournefortia argentea* open
l a fl. *Sporobolus virginicus* open
l c fl. *Suriana maritima* open
c *Cyperus planifolius*
o *Borreria arborescens*
l c *Sesuvium portulacastrum*
o *Eriothalis*
l c *Euphorbia mesembrianthemifolia* open
l o *Cordia subcordata*
l *Bumelia*
l o *Thrinax*
l *Fimbristylis cf. cyperus*
a *Ageratum*
r *Melanthera nivea* ?
r *Dioscoreophala* ?
l o *Coccoloba uvifera*
r *Euphorbia* sp.
sterile grass

Nov 2 Small Cay

*Luriana**Tournefortia**Crinum**Casuarina**Euphorbia* ~~*hirsuta*~~ ^{*megacanthos*}*Cyperus planifolius**Ipomoea macrantha**Descurainia portulacastrum*

(2 forms?)

*Conocarpus erectus**Euphorbia**Euphorbia**Euphorbia**Borrichia arborescens*

Island is a triangular accumulation of cobble-ry rubble a somewhat rounded coral ~~gravel~~, with the smaller angle somewhat prolonged into a curved rather broad blunt spit. On the north side the gravel is smaller and has much sand. The interior of the larger end is a depression of rocks, with dense *Borrichia*. Eastern end is being undercut and ~~is~~ falling down.

6 *Anolis*5 *Turnstones*1 *Sanderling*1 *Wood pewee*

3 speckled hawks, keel-like tails, slender tail

The main vegetation is a closed tall scrub (63 x 42) of *Luriana*, varying locally to *Conocarpus*. A few young coconuts, and scattered germinating nuts. A single *Casuarina* seedling, protected by a circle of boulders. 30 x *Crinum* plants. A belt of low *Tournefortia* scrub 5 m around the margins except where they are undercut.

Nov. 2 - Small Cay (Long Cay North)

~~on~~ coral sand and gravel53774. *Sporobolus virginicus* L.

(4) very local in interior small opening on

(4) 75. *Suaeda maritima* L.

dominant in scrub on highest ground

(3) 76. *Paspalum distichum* L.

one tuft seen on open

(4) 77. *Conocarpus erectus* L.

dominant locally in scrub on

(4) 78. *Borreria arborescens* (L.) DC.

dominant in interior depression on

(2) 79. *Cinnamomum*

4 plants only seen on sand on north side, edge of scrub,

(2) 80. *Cyperus planifolius* L.C. Rich.

in open coral sand in opening in scrub.

(4) 81. *Cyperus planifolius* L.C. Rich.

occasional on periphery of vegetation

(6) 82. *Euphorbia blodgettii* Engelm. ex Hitchc.

small colony in small opening in tall scrub

(4) 83. *Tournefortia gnaphalodes* (L.) R.Br.

abundant around periphery of vegetated part of island

(5) 84. *Ipomoea macrocarpa* R. & S.

very local in scrub

shrub to 3 m tall, green, petals bright yellow.

diffusely branched shrub 3 m tall.

shrubs 0.5 - 1 m tall, leaves fleshy, glossy green, rays yellow.

tufted

tufted

stems arching, flowers dull yellowish.

mound-like gray shrub, flowers white

twiner, flowers white collapsed in midafternoon

53785. *Philoxerus vermicularis*
local

86. *Euphorbia*
locally common in open flat
on north side of island

87. *Euphorbia*
very local on open flat
on north side of island

88. *Euphorbia mesembrianthemifolia* L.
abundant around
periphery of island in open

89. *Promoea pes-caprae* subsp. *brasiliense* (L.) v. Ooststr.
very local on gravel spit

90. *Sesuvium portulacastrum* L.
very common in open
periphery of

Nov. 3 - Long Cay
in coconut grove with
very little undergrowth

91. *Thiarea ~~pauciflora~~ floridana* var. *long.*
occasional near southwest
end of island, several
mature plants (with infls.)
and a number of very
small ones, plus very small
seedlings.

92. *Fimbristylis cf. cymosa*
common in one area near
southwest end.

93. *Dichrocephala* ?? mob. *egregium* but abnormal
very rare on bare sand

prostrate, forming loose
mats, stems brownish red,
leaves sub-fleshy, all seen
sterile. Stems brittle.

stems spreading, somewhat
ascending, dull yellowish
green, lactiferous.

very prostrate
sub-fleshy, gland
appendages white.

stems strongly ascending,
leaves very pinnatifid.

prostrate, all seen
sterile

very fleshy, mat-forming
stems slightly reddish
flowers light rose pink.

trunk about 6-8 cm diam,
erect, enlarged at base, up
to 3 m tall, infls. and buds
axillary, panicle ascending
and arching, specimens
from 2 plants, each 1.5 m tall.

tufted, culms ascending,

heads grayish white,
leaves rather fleshy, (to 130)

Nov. 3 - Rain all morning and part of afternoon.

In center of north end of Cay is a great deal of pumice pebbles, one Entada seed, and other items that appear to be drift - 150 m from lagoon and 30 m from sea.

Large area of typical atoll phosphate rock north of marshy area. Bright orange-brown white speckled.

A few ^{large} bushes of *Bumelia* just inside boulder ridge at edge of marsh. A few small bushes of *Cordia sebestena*.

Dominant herb layer in most of coconut plantation is *Ageratum* sp. with some *Cyperus planifolius*.

The marsh is filled with coconut leaves. Small coconut trees planted on mounds of sand.

Collected small snails on bottom of pumice cobbles. Also some very small insects.

Large patch of *Hymenocallis* on cobble ridge back of marsh.

Scattered *Coccoloba uvifera* on back slope of beach ridge.

53794. *Melanthera* ~~?~~ *nivea* (L.) Small?

①

95. *Bumelia retusa* Sw.
a few bushes back up
cobble ridge on seaward side.

①

96. *Mucuna*

one seedling seen

②

97. *Euphorbia*
occasional

2

98. (fungus)

③

99. (fungus)

② 53

800 (fungus)

~~all~~

all on coconut wood

②

01. (fungus)

on *Thrinax* and coconut wood.

Nov. 5 - Long Cay

F

① 5

02. *Halodule*small patch in fine
sediments in lagoon just
off hook of north peninsula.in open scrub on north
peninsula

⑩

03. *Conocarpus erectus* L.
common

⑩

04. *Barringtonia arborescens* (L.) DC.
occasional

⑩

05. *Sporobolus virginicus* L.
locally abundant in opening
and ~~on~~ beach ridge.

⑩

06. ~~B.~~ *Eriothalis fruticosa* L.
occasional on broken coral

plant 6 dm tall

slightly lactiferous much-
branched shrub 3 m tall,
flowers whitish,
scandent.strictly erect, slightly
arching at tip.

pileus dome-shaped, tan with 2 brown bands, gills white.

pileus bright red, very mucilaginous, gills white.

pileus, gills, and stipe deep tan

pileus, ~~and~~ ^{stipe and} gills pale tan.much branched ^{spreading} shrub about
1 1/2 m talllow rounded bush, flowers
yellow.

culms erect from rhizomes

low rounded bush, flowers
white.

Nov. 6 - Flight around and
across atoll. 12:40 p.m.

Small amphibious plane

Reef north of NE Cay

First part excellent
spur and groove seaward
margin for a mile or so,

then much less so. No sign
of an algal ridge. After
second curve, good spur and
groove again. Thalassia zone
in shallow water, clear
sand lagoonward for
about twice width of reef +
Thalassia zone. Some small
sand bars on inner edge
of clear zone locally.

Wide shallow area at north
end after a fairly wide channel
on windward side.

Spur and grooves extend
a long distance out from
reef flat margin ($\pm 0.5 - 1$ km)
into blue water.

Considerable coral along
with the Thalassia on reef
flat. Clear band in Thalassia
around coral patches very

Photos of cays

Reef very patchy at south
end. Very conspicuous
white band around coral
clumps in Thalassia on
reef flat and also on deeper Thalassia beds
on lee side.

Water holes on both
Middle and NW Cay I.

Leeward side has
Thalassia in medium
depth water, many
circular coral patches
in this Thalassia, with clear
bands.

Patch reef, in lagoon has
coral in crescent shape on
windward side, sandy
area with less coral
on leeward. Slope abrupt to
deep water.

Nov. 6 Northeast Cay

plants

Cocos nucifera
Isagrostis domingensis ✓
Wedelia triloba ✓
Lesurium
Tournefortia
Cardia sebestena ✓
Sporocarpus erecta
Ambrosia hispida ✓
Cyperus planifolius ✓
Eriothalis fruticosa
Borreria fruticosa
Imbristylis
Paspalum
Chloris petraea
Euphorbia
Terminalia catappa
Coccoloba
Mussa (seedling)
Ernodea littoralis
Chrysobalanus icaco
Bursera simaruba
Euphorbia blodgettii
Euphorbia mercurianthera
Thrinax folia
Neea choriophylla

- F Nov. 5 - Long Cay
 53907 (seedling)
 ① on beach of passage at north end
 ② 08 (fungus)
 on coconut log

Ficus
Paspalum
Acrostichum aureum
Hymenocallis littoralis
Ciumm sp.
Sapota
 unidentified seedling

mucus pale gray, gills turning black

Nov. 6 - Northeast Cay
in coconut grove.

53808 ²⁰ *Terminalia catappa* L.
occasional in rather open area

(4) 10. *Borrichia arborescens* (L.) DC.
small patch in

(10) 11. *Euphorbia*
several plants

(4) 12. *Chloris petraea* Sw.
very local

(10) 13. *Paspalum pleostachyum* Doell. ^{extensive}
locally common

(4) 14. *Enithallis fruticosa* L.
occasional

(1) 15. *Fimbristylis* sp. *cymosa*
rare

(1) 16. *Polyporus*
on rotten coconut log.

(1) 17. *Coprinus*?
on rotten coconut log

(10) 18. *Eragrostis dillingensis* (Pers.) Steud.
common locally in low place

(10) 19. *Passiflora suberosa* L.
occasional

(4) 20. *Cyperus planifolius* L. C. Rich.
common

(10) 21. *Wedelia trilobata* (L.) Hitchc.
common

tree 8 m tall, fruit green,
flowers on low elongate
branches near ground.
low tangled bush, leaves
fleshy.

erect shrub 0.3 m tall,
milkier.

tufted, culms almost erect

tangled, fruiting
culms erect.

shrub 1 m tall, fruits turning
pinkish. (Other plants seen
to 1.7 m tall)

white

light yellow

small tufts, culms
erect, panicles arching.
flowers cream color with
reddish bases to corolla segments,
ripe fruit dark blue.

small tufts, culms
somewhat spreading,
prostrate, forming
mats, flowers yellow.

same - on seaward beach ridge

- 53822 *Euphorbia*
 (5) small colony on rather fine ~~coral~~ coral gravel
 (1) 23. ~~Bursera~~ *Euphorbia blodgettii*
 on tree roots
 (5) 24. *Bumelia retusa* Sw.
 one clump

same - rubble flats along north shore

- (4) 25. *Sporobolus virginicus*
 common in rather sandy spots
 (4) 26. *Conocarpus erectus*
 common, forming thickets
 (10) 27. ~~Ernodea~~ *Ernodea littoralis*
 occasional, scattered bushes
 (1) 28. *Euphorbia blodgettii* Engelm. ex Hitchc.
 rare, on ~~uprooted~~ uprooted coconut stump.
 (1) 29 (seedling)
 on top of beach
 (10) 30. *Chrysobalanus icaco* L.
 occasional, scattered shrubs
 (4) 31. *Coccoloba uvifera* L.
 occasional ~~etc~~

same - in *Bursera* grove in interior of island

- (4) 32. ~~Laguncularia~~ *Nesaea choriophylla* Stand.
 small colony
 (4) 33. ~~Porteria~~ *Porteria campechiana*
 single plant

prostrate, pale green.

prostrate, stems reddish.
 shrub 3m tall, rather yellowish green, buds only.

sharpe stand, culms ascending to erect.
 shrubs 3-4m tall.

tangled low mound-like shrubs, leaves rather fleshy, flowers purple, fruits orange, fleshy.
~~etc~~ prostrate, stems reddish.

low mound-like shrub.
 fruit fleshy.
 low shrub, sterile.

shrub 4m tall, sterile.

shrub 5m tall, sterile.

53834 *Bursera simaruba*
 ⑤ dominant

⑤ same - ~~on beach~~
 just back of beach
 in lagoon north corner.

④ 35 *Sesuvium maritimum* L.
 very common, forming mats

④ 36 *Tournefortia gnaphalodes* (L.) R.Br.
 very common, forming loose mats

④ 37 *Euphorbia mesembrianthemifolia*
 very common

① 38 ~~(Paspalum)~~ *Paspalum pterostachyoides*
 locally common on sand

same - on passage
 beach ridge of cobbles and boulders

⑩ 39 *Cordia sebestena* L.
 common

⑩ 40 *Ambrosia hispida* Pursh
 locally abundant
 here and in coconut groves.

Nov. 7 - Northeast Cay
 sand and gravel flats
 back of shore.

④ 41 *Hymenocallis littoralis* (Jacq.) Halist.
 very local

① 42 *Crinum*
 one plant seen

(to p. 144)

small tree to 8 m tall,
 bark red-brown, peeling,
 smooth; sterile.

stems green,
 prostrate, leaves very
 fleshy, ~~flowers~~ glossy,
 flowers red-pink.
 low spreading gray
 shrub, flowers white.
 stems erect, spreading at tips.

prostrate, forming a
 mat-like sod; ~~sterile~~ sterile.

tree to 7 m tall; flowers
 orange-vermillion.
 prostrate, forming a
 loose mat; racemes erect.

small clump, scape
 compressed, with 2 keels.
 about 1 m tall, flowers
 white; leaves distichous.
 scape about 0.7 m long,
 leaves spirally arranged.

Nov 7 - Northeast Cay

Center of islet has
a mixed forest of *Bursera*
& coconut, with 53832, *Thrinax*,
Coccoloba, partly on flat
rather fine soil, partly
on rolling mounds of
broken coral rubble. Some
humus accumulation, but
mixed with coral sand
and pebbles.

Some phosphate in a pile
of boulders, but none
seen in place.

Small water depression
filled partly with *Acrostichum*.

Mixed scrub on
boulder ridge
near

Bumelia

Cordia

Coccoloba

Tournefortia

Nov. 9 - Air trip to Lighthouse
Reef. Left 9:15 a.m. Weather
very still, broken clouds.
Sea glassy.

144 1971 British Honduras

53843 *Euphorbia blodgettii* Engelm. ex Hitchc.

(10) abundant locally on
coarse sharp broken coral rubble

(1) 44 (seedling)
on coral sand,

~~45 Ficus~~
very local

same - in scrub on
back slope of wide
coarse coral boulder ridge.

(10) 45. *Ficus ovalis* (Liebm.) Mig.
very local

(10) 46. *Neelechoiophylla* Standl.
locally very common

4
same - in *Bursera* grove
in center of island

(1) 47. *Bursera simaruba* L.
dominant

(1) 48 ?

same - around water-hole
near center of the island.

(4) 49. *Acrostichum aureum* L.
common

Nov. 7 - Long Cay
in 2 m. depth water
just off tip of north
peninsula.

(10) 50. *Syringodium filiforme* Kütz.
dominant in *Syringodium* -
Thalassia meadow.

Glover's Reef

145

prostrate; stems reddish

A densely branched
shrub 1.5 m tall.
shrubs 4 m tall, inflorescences
pendulous, ripe fruit
red, fleshy.

flowers whitish.

in

rhizome to 0.4 m tall,
bonds 2 m tall.

rhizomes buried;
leaves terete; sterile.

F. 53 Nov. 7 Northeast Cay

53851 (fungus)

- (2) in litter and humus under
Coccoloba uvifera

32

(1) 32 (fungus)

on rotting log

(1) 52a *Clavaria* on rotting wood

F. 53 Nov. 9 - Southwest Cay I

- (1) 53. *Batis maritima* L.
common in edge of mangrove swamp

- (5) 54. *Avicennia germinans* (L.) L.
scattered in open part of

- (4) 55. *Laguncularia racemosa*
dominant in landward
side of swamp

56

same - on shingle ridge
on south side

- (5) 56. *Cordia subcordata* ~~sebastena~~ L.

same on lagoon beach

- (6) 57. *Borreria arborescens* (L.) DC.
a large shrub

- (2) 58. *Spartina patens* (Ait.) Muhl.
locally dominant back of

to page 154

- gills salmon pink, pileus
deeper salmon pink,
stipe salmon changing
downward to yellow
— whole ^{plant} cream-white,
gills slightly darker.
— soft cartilaginous, burnt orange
color.

- dwarf shrub with
arching stems, fleshy
leaves and fruits.
— spreading tree 5-6 m tall,
surrounded by pneumato-
phores, leaves whitish beneath,
sterile.
— small sterile tree,
4-5 m tall, leaves green
beneath, surrounded by
club-shaped pneumatophores.

- ~~A~~ dense rounded shrub
2 m tall; rays yellow,
— leaves fleshy
dense stand, rhizome
deeply buried, sterile.

Nov. 9 Arrived ^{over} Lighthouse Reef 9:25 am.

Long Cay

Half Moon Cay

Northern Cay

Sandbarre Cay

Saddle Cay only a tiny sandbar, ^{barely} exposed.

} seen from a distance.

Lagoon has far fewer patch reefs than at Glover's, but still many. No really deep water seen except Blue Hole, a roughly circular sink lined by a shallow reef with many small rocks breaking the surface.

Made several passes over Half Moon Cay but could not land. Vegetation on small end very sparse coconut grove. Village of several houses here. Dense scrubby forest on large portion, somewhat chlorotic. Many red-footed boobies in trees and flying.

photos

A few photos of cay and one of coral patches (second roll.)

On way back, between Lighthouse and Glover's, a waterspout some way to right, sea very calm, a tubular curved funnel-~~to~~ reaching down from a ~~to~~ cloud, apparently nimbus, not very dense, disturbance in water limited to immediate area of lower end of funnel.

Nov. 9 - Southwest II Cay

Mostly rather thinly
planted to coconuts.

Most of area sandy.

Patch of *Rhizophora*
on passage side.

Areas of *Sporobolus*
virginicus near beaches.
Large patch of *Spartina*
with some *Fimbristylis* is
near lagoon end of pass.

Patches of *Capriaria*,
Ageratum, *Wedelia* here
and there. ~~PB~~ Patches
of *Passiflora*. *Rivina*
dominant over much of
interior of coconut grove.
Large patch of *Eriothalis*
near south end.

Only 2 small *Tournefortia*
seen. *Ipomoea macrantha*
common locally in grove.

I. pes-caprae scarce on
s.w. end and south part
of lagoon beach.

Plants.

a	<i>Cocos nucifera</i>
la	<i>Sporobolus virginicus</i>
l	<i>Paspalum distichum</i>
n	<i>Paspalum</i>
l	<i>Eragrostis domingensis</i>
la	<i>Spartina</i> ?
la	<i>Wedelia trilobata</i>
lc	<i>Euphorbia mesembrianthemifolia</i>
l	<i>Euphorbia blodgettii</i>
lc	<i>Euphorbia</i> sp.
lc	<i>Conocarpus erectus</i>
n	<i>Terminalia catappa</i>
c	<i>Iresine</i>
c	<i>Portulaca oleracea</i>
la	<i>Capriaria biflora</i>
n	<i>Terminalia catappa</i>
lb	<i>Cenchrus pauciflorus</i>
la	<i>Eriothalis fruticosa</i>
ln	<i>Hymenocallis</i>
la	<i>Ageratum littoral</i>
la	<i>Rivina humilis</i>
c	<i>Cyperus planifolius</i>
lc	<i>Fimbristylis cf. cymosa</i>
c	<i>Passiflora suberosa</i>
la	<i>Ipomoea macrantha</i>
l	<i>Ipomoea pes-caprae</i>
l	<i>Rhizophora mangle</i>
a	<i>Coccoloba uvifera</i>
n	<i>Tournefortia</i>
lc	<i>Sesuvium portulacastrum</i>
l	<i>Canavalia rosea</i>
l	<i>Luriana maritima</i>

Nov. 9. Southwest Cay # I

Mostly planted to coconuts, but two mangrove swamps, one on north side one on passage.

Photo 10 years old shows coconuts planted in west mangrove swamp and no mangroves except around outer edges.

Euphorbia mesembrianthemifolia
Euphorbia sp.
Spartina
Rhizophora mangle
Avicennia germinans
Commersonia racemosa
Conocarpus erectus
Coccoloba nucifera
Besleria
Portulaca oleracea
Cordia sebestena
Fimbristylis cymosa
Cyperus planifolius
Eragrostis domingensis
Paspalum distichum
Sporobolus virginicus
Tournefortia gnaphalodes
Eriothalis fruticosa
Capriaria biflora
Ageratum littorale
Andropogon virginicus
Batis maritima
Borrichia arborescens
Passiflora suberosa

Southwest Cay I (ctd.)

same - on passage side,
near mangrove

53359. *Paspalum distichum*
 (2) locally abundant

4

same - in sparse coconut
grove near abandoned
dwellings

- (5) 60. *Andropogon ~~argenteus~~ glomeratus* single erect culms
occasional

same - south side

~~on~~ on shingle ridge

- (2) 61. *Tournefortia gnaphalodes* (L.) P.Br.
occasional

F. 2

with
2 R. Stoddartsame - near dwelling
in open coconut grove

- (1) 62. *Chloris petraea*
 (1) 63. *Eragrostis domingensis* (Pers.) Steud.
 (1) 64. *Stachytarpheta jamaicensis*
 (1) 65. *Ageratum ~~conyzoides~~ ^{littorale Gray HBK}*
 (1) 66. *Passiflora rubra* L.
 (1) 67. *Capriaria biflora*
 (2) 68. *Eriothalis fruticosa* L.

with
R. Schneider

Nov. 9 Southwest Cay II

- (5) 68a. *Portulaca oleracea* L.
on sandy ground in coconut
grove

sterile

small bushes, all seen
sterile

flowers pale blue-lavender.

flowers white

flowers white

fleshy, leaves obovate,
flowers yellow, closing
about noon, stamens 12-20,
style branches 3-5; mostly 4

Nov. 9 - Southwest Cay II
open coconut plantation on
sandy soil, northwest end

53869. *Fimbristylis cymosa* R.Br.

locally common in

70. *Helios petraea*

occasional in

71. *Eragrostis domingensis* (Pers.) Steud.

locally common in

72. *Paspalum pleurostachyum* Doell. *hexum* Ten.

very local

73. *Paspalum distichum* L.

common near passage
beach

74. *Sporobolus virginicus*

dominating some areas
near beach.

75. *Spartina ? patens* (Ait.) Thubl.

dominating considerable
area near beach

76. *Euphorbia*

very common near
passage beach.

77. *Capraia biflora*

dominating large patches

78. *Lesuvium portulacastrum* L.

local on and just back
of beaches

79. *Canavalia rosea* (Sw.) DC.

occasional in

80. *Stachytarpheta jamaicensis* (L.) Vahl

local, in places common

81. *Morinda citrifolia* L.

rare, 2 small plants seen

in dense, usually small
clumps, culms erect or ascending,
small tufts, culms ascending

culms ascending, panicle
arching.

culms depressed to ascending.

culms erect, not tufted.

forming a loose sod,
fruiting culms erect from
buried rhizomes.

sterile

prostrate or almost
so, stems green, leaves
pale beneath.

erect, somewhat branched,
flowers white

prostrate, ^{stems reddish} forming mats,
leaves very fleshy, flowers
rose pink.

prostrate, creeping,
flowers bright rose pink.

flowers rather light blue

shrub, flowers white.

53882

53882

① *Terminalia catappa* L.one tiny, partly dead plant
seen back of beach crest,
plus one seedling.① 83. *Calile lanceolata* (Willd.) Schult?
 & ~~seedling~~ small plants only in⑤ 84. *Cyperus planifolius* L.C. Rich.
common generally in④ 85. *Euphorbia mesembrianthemifolia* L.
fairly common, mostly
near beaches④ 86. *Passiflora suberosa* L.
very common, covering
ground locally in patches.⑤ 87. *Euphorbia blodgettii* Engelm. ex Hitchc.
very local in④ 88. *Presine diffusa* H.B.K.
common④ 89. *Rivina humilis* L.
common, dominant in
~~much~~ of coconut grove.④ 90. *Conocarpus erectus* L.
~~large tree~~, in edge of water
same - passage beachsame - sand flats in
coconut grove, near
south end of bay④ 91. *Cenchrus paniculatus* L.
occasional back of
lagoon beach④ 92. *Sporobolus peruvianus* var. *brasilianus* (L.) var. *brasilianus*
occasional back of lagoon beach

sterile.

sterile

small tufts, culms ascending.

erect, spreading toward top.

vine, flowers ^{greenish} cream color,
corolla segments dark at base;
fruits immature.stems prostrate to ascending
and arching, reddish.

suffrutescent herb.

large tree, fallen but
still alive.

culms rather depressed

53893. *Luriana maritima*
 (4) very local just back of beach

(13) 94. *Coccoloba uvifera* L.
 one small plant just back of beach

3 95. *Eriothalis fruticosa* L.
 large patch on interior flat, a few plants on rubble ridge.

(10) 96. *Sporroea macrantha* R. & S.
 very common in large patch on interior flat.

(10) 97. ~~*Ageratum*~~ *littorale* Gray
~~*maritimum*~~ HBK.
 abundant in large patches

(6) 98. *Ernodea littoralis* Sw.
 one plant seen

(5) 99. *Cyperus planifolius* ^{L.C.} Rich.
 occasional

53900. *Tournefortia gnaphalodes* ^{HBK.}
 (2) two small plants, only, seen.

(10) 01. *Sporroea stolonifera*
 one dense patch not far from passage beach

(2) 02. *Chloris petraea*
 very local

(1) 03. *Wedelia trilobata* (L.) Hitchc.
 common in patches

same in ^{sea} water in passage

(14) 04. *Rhizophora mangle* L.
 small mangrove swamp, this species only

shrubs 2.5 m tall,
 - ~~fruit~~ fruit immature.
 depressed shrub, 4 dm tall,
 sterile.

shrubs 1 m tall, flowers
 white, ripe fruit purple-
 black, glossy.

extensive twiner, flowers
 white, collapsed just
 after noon; accrescent
 sepals fleshy.
 flowers pale lavender to
 bluish lavender.

low mound-like bush
 0.5 m tall, of arching branches
 rooting at tips, flowers purplish
 white.

small spreading to ascending
 tufts.
 sterile

spreading, mat like,
 rhizomes superficial or
 slightly buried; sterile
 culms ascending.

prostrate, creeping,
 forming loose mat; head, yellow.

small sterile trees 4 m tall.

same - on rubble ridge
back of passage beach

53905. *Hymenocallis littoralis* (Jacq.)
(2) occasional very locally

same - on rotting coconut
logs

- (2) 06 *Polyponus cinnabarinus*
common

Nov. 12 - West Channel

- (1) 07. *Thalassia testudinum* ^{Koenig & Sims}
open stand on sandy, rocky
bottom of channel, rhizomes
deeply buried

Nov. 12 - Long Cay
in open scrub on north
peninsula

- (11) 08. *Tournefortia gnaphalodes* (L.)
very common

- (10) 09. *Luriana maritima* L.
very common

- (10) 10. *Sesuvium portulacastrum* L.
very common just back
of beach

- 53909 (7) sub-fleshy ^{long leaves}
; flowers white, ^{long} anthers
orange.

million, pileus
orange and
banded.

led gray bushes,
bitter, fragrant.
5 m tall, flowers
red become
pressed to stems
none and at night.
during day unless

prostrate, forming
leaves very
fleshy, green,
rose-pink.

same - on rubble ridge
back of passage beach

53905. *Hypnocalais littoralis* (Jacq.) ^{talieb.}
(2) occasional very locally

same - on rotting coconut
logs

- (2) 06 *Polypterus cinnabarinus*
common

Nov. 12 - West Channel

- (1) 07. *Thalassia testudinum* ^{Koenig & Sims}
open stand on sandy-rocky
bottom of channel, rhizomes
deeply buried

Nov. 12 - Long Cay

in open scrub on north
peninsula

- (11) 08. *Tournefortia gnaphalodes* (L.) R.Br.
very common

- (10) 09. *Luriana maritima* L.
very common

- (10) 10. *Sesuvium portulacastrum* L.
very common just back
of beach

leaves sub-fleshy, ^{very fragrant}
distichous; flowers white, ^{anthers}
and pollen orange.

gills vermillion, pileus
orange or orange and
whitish banded.

sterile

low rounded gray bushes,
flowers white, fragrant.
shrubs 1-1.5 m tall, flowers
yellow; leaves become
closely appressed to stems
during storms and at night,
spreading during day unless
too stormy.
stems prostrate, forming
mats, leaves very
fleshy, glossy, green,
flowers rose-pink.

Nov. 12 boat trip to leeward reef

A cattle egret flew parallel to course several hundred m south, mostly down near waves, but occasionally up to 20-30 m, looked at several patch reefs, first of which had a rock above surface, didn't stop.

Finally at near center of lagoon was a patch reef with a tiny gravel bar. Egret settled here. Flight seemed very direct and purposeful.

Weddle Cay -

Large planted to coconuts, but with substantial mangrove area with some in middle. Leeward side of this partially stripped of mangrove and a tough peat layer exposed on inner part of reef flat. Mangroves between shore and pool are buried to a meter or more depth in coarse coral gravel, and looking very poor. (peat sample)

South of this swamp is a thicket of Pithecellobium with a few large trees of Coccoloba, Terminalia, etc. or Sesuvium and Lurians extremely scarce. Paspalum dominant ground cover in large area of coconut grove west of old house.

Mixed forest of Nees, Ficus, etc. on boulder ridge, along with much Tournefortia. Ernodea very abundant on this cay. In north part practically pure stands forming a tangled low scrub.

Disturbance by human activity on Glover's Reef

lobster fishing by Honduras boat and divers.

Conch collecting by Lomonts.

All cays planted to coconuts except for a few small areas even attempted in mangrove swamps. A few coconut trees even on Small Cay. Cobble and boulders in groves piled up. In Long Cay coconut leaves gathered and put in swamps and on boulder ridge. Husks piled in large piles on SW and NE cays. Coconuts removed for sale in Belize some fishing.

Houses built around periphery of Long Cay (about a dozen + dining hall).

Garbage and sewage regularly buried in interior.

Much lumber and misc trash washed up on beaches. 2 dogs, 1 sheep, 1 cat, 3 rabbits a few chickens & turkeys on island brought as pets or to eat.

Oil film on water of lagoon resulting from gasoline motors in boats.

Land crabs from Glover's Reef
det. H. B. Roberts

Sesarma (*Holometopus*)
ricordi H. Milne Edwards

Cardisoma guanhumi Latreille

Oryzode quadrata (Fabricius)

same - in coconut

- 53911 *Ageratum maritimum* H.B.K. littoralis
 (1) very abundant, forming
 most of ground cover.

- (2) 12. *Ageratum maritimum* H.B.K.
 (same as 53911 but apparently
 diseased)

- (10) 13. *Cyperus planifolius* L. Rich.
 common

same - on seaward boulder
 ridge

- (3) 14. *Cordia sebestena* L.
 a few low shrubby plants

- (5) 15. *Hymenocallis littoralis* (Jacq.) Halib.
 locally very abundant
 (also planted along paths)

same - at top of lagoon beach

- (3) 16. *Spartina patens* (Vit.) Thunb.
 very sparsely scattered
 in stands of *Thrasbolus*.

with
 D.R. Stoddart
 (June 53925)

Nov. 12 - Middle Cay
 in middle of cay
 in forest remnants

- (5) 17. *Pithecellobium keyense* Britt. & Schae.
 abundant

- (3) 18. *Erithalis fruticosa* L.
 common

- (2) 19. *Thrinax floridana* Lagr.
 one tree seen.

Thrinax radiata L.f. Schultze & Schultze

flowers pale lavender to
 bluish lavender.

small tufts, culms
 spreading.

flowers bright orange-red.
 seabe compressed, sharp-
 angled; flowers white

erect, small tufts.

shrubs to 4 m tall.
 all seen sterile.

shrub to 1.5 m tall, flowers white

single stem 3 m tall.
 soft panicles drooping.

- to same on lagoon beach
- 39 ~~20~~ ²¹ *Sesuvium portulacastrum*
very local, seen only at
one place.
- 4 ²¹ *Hibiscus tiliaceus* L.
rare - no small plant seen.
- same - on north-east
point of Cay
- 1 ²⁷ *Dioscorea maritima* Thonn.
rare at top of beach, one
plant seen
- 23 ~~23~~ same - on ~~beach~~ boulder
ridge on seaward side
- 5 ²³ *Euthalis fruticosa* L.
common
- 5 ²⁴ *Tournefortia gnaphalodes* (L.) B. & P.
abundant
- 1 ²⁴ ~~24~~ *Pisonia*
^{rare, seedlings only seen}
same - in coconut plantation
on sand flat
- 5 ²⁵ *Euphorbia*
very local.
- 26 ^{Nov. 12} *Coccoloba uvifera* L.
no small plant on new spit
built since 1969

stems prostrate, forming
mats, leaves very fleshy,
glossy, flowers rose pink.
shrub 2 m tall, sterile

depressed, flowers
white.

shrub 1 m tall, flowers
white, fruit black
when ripe

low rounded gray bushes,
fruit fleshy, pale
green, flowers white,
fragrant.

strictly erect shrub
0.6 m tall.

low sterile shrub about
6-7 dm long.

Dec. 24 - Shutesbury
Fosberg - Blunt property
and open blueberry barren
~~next~~ adjacent. $72^{\circ}26'W$ $42^{\circ}27'N$

The 2 acres owned are
in rather young second-
growth woods of *Pinus*
strobus and associates,
crowded, mostly less
than 15 cm dbh.

Trees:

- a *Pinus strobus*
- c *Pinus rigida*
- o *Tsuga canadensis*
- c *Betula papyrifera*
- lc *Quercus coccinea*
- " *Quercus rubra*
- " *Quercus alba*
- c *Acer rubrum*
- Betula populifolia*

Shrubs

- lc *Vaccinium* sp. (low bush)
- lc *Kalmia latifolia*
- lc *Kalmia angustifolia*
- " *Vaccinium corymbosum*
- Gaultheria procumbens*

Herbs

- lc *Lycopodium obscurum* v. *obscure*
- lc *Coptis groenlandica*
- lc *Epigaea repens*
- " *Mitchella repens*
- " *Lycopodium clavatum*
- " *Lycopodium complanatum*

Blueberry barren -
apparently an abandoned
pasture, may have been
burned but not very recently

Very low *Vaccinium* is
locally abundant, with
Cladonia, *Lycopodium*
obscurum var. *dendroideum*,
Lycopodium tristachyum,
scattered *Juniperus communis* var.
prostrata, *Gaultheria procumbens*

Pinus strobus in area
seems to have predominantly
very appressed needles,
on some trees more or less
spreading. Should be
correlated with annual
vs. biennial leaf-fall. Also
should be checked to see
if needles are appressed or
spreading in summer.

Barrens - *Betula populifolia*

Salix sp.

Lycopodium clavatum

Solidago

Andropogon scoparius

Other species nearby

Fagus grandifolia
Betula alleghaniensis
Pinus strobus
Osmunda cinnamomea
Viburnum cassinoides?
Lycopodium complanatum
Vaccinium corymbosum
Osmunda cinnamomea

Swampy area which is the head of a stream running west begins on back part of lot immediately adjacent on south, perhaps 10 m from corner of today's lot.

This swamp is a hummocky area of mostly

Betula alleghaniensis

B. populifolia?

B. papyrifera?

Acer rubrum

Fagus grandifolia

Pinus strobus

an open shrub layer up to 5 m tall of *Kalmia*

latifolia with some *Vaccinium corymbosum*

Viburnum
Rhododendron ~~sp.~~ *vacuum*
 on ground

Cypripedium virginicum

Osmunda sp.

Sphagnum

Gaultheria procumbens

1

200

